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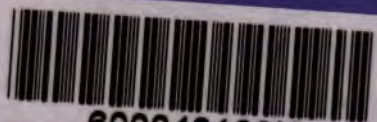
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STRATHPEFFER SPA
IN
THE HIGHLANDS.

D. MANSON, M.A., M.D., C.M.



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ON THE
SULPHUR & CHALYBEATE WATERS
OF
STRATHPEFFER SPA.
IN THE
SCOTTISH HIGHLANDS.

BY
D. MANSON, M.A., M.D., C.M.

WITH LOCAL GUIDE.

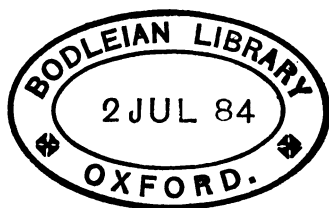
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1884.

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C



TO HER GRACE THE
DUCHESS OF SUTHERLAND,
COUNTESS OF CROMARTIE,
THE OWNER OF STRATHPEFFER SPA,
THIS LITTLE WORK
IS RESPECTFULLY AND BY PERMISSION DEDICATED.

P R E F A C E
TO THE
F I F T H E D I T I O N.

THE former editions of this work having met with ready acceptance at the hands of the health and pleasure-seeking public, I am encouraged in bringing forward the present republication. Having recently returned to Strathpeffer, after eleven year's practice in England, during which the last three editions were drawn up, I am the better enabled to offer new information on the Spa. In this, I have carefully revised and considerably added to the last (Fourth) Edition. On both chemical and physiological grounds Strathpeffer, as a Sulphur Spa, is shown to be, as has been pointed out in former editions, among the foremost of its class in Europe, and far before any in Great Britain. It is 18 hours by rail from London. The climate is mild yet bracing and dry—in a word salubrious, and that in a high degree. To the fact that the good to be derived from the Spa is not confined more to the summer than to the winter months, I would draw special attention.

EAGLESTONE, STRATHPEFFER SPA,
March, 1884.

P R E F A C E
TO THE
F I R S T E D I T I O N .

THE present little work, intended specially for strangers visiting Strathpeffer, is an expansion of a pamphlet, "On the Strathpeffer Spa," published for the medical profession some time ago, by the author. In this, he has attempted to render as intelligible as possible to the non-medical mind the subject of the Waters. In treating the Walks and Drives, &c., he has endeavoured to be concise, rather only indicating them and leaving his readers to go and see for themselves ; and in this latter part of the work, he begs to acknowledge aid mainly from the excellent "Guide to the Highlands," of the Messrs. Anderson, of Inverness.

STRATHPEFFER SPA, July, 1869.

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STRATHPEFFER SPA.

PART I.

THE importance of this Spa as a health resort, in many diseased conditions of the human frame, cannot well be over-rated. Having now attained no little celebrity, and being evidently destined, sooner or later, to occupy a very prominent position among the Spas of Europe, it has a special claim on the attention of the medical profession.

Persons requiring change of air, or the use of such waters as those of Strathpeffer, and who are strong-minded enough to weigh between fashion and fact, and to whom time, money, and long journeys are a consideration, would do well, before rushing abroad, to make trial of this powerful, picturesque, and now easily accessible *Home Spa*, situated as it is in one of the most beautiful districts of Scotland, with a climate which will bear the most favourable comparison with that of many pet foreign resorts, and waters among the first of their class in Europe, while it is on the property of a noble family, whose name alone is a guarantee, that neither enterprise nor money are wanting in the development of the natural resources of the place.

"The example of the Queen in her visit to Loch Maree" (the queen of Scottish lakes, and now within easy access from the Spa), "in September, 1877, administers," says a leading journal of that date, "to our roving fellow-citizens a gentle reminder that, while finding enchantment in holidays at a distance, they may be allowing to remain unappreciated, scenery invested with natural and historic associations, not less impressive in their own country. . . . The Queen has always been distinguished by a lively interest in the varied physical characteristics and historic memories of her home dominions, and in no respect are the purity and simplicity of Her Majesty's tastes more apparent than in the kindly enthusiasm she has long indulged for the Highland scenery of Scotland."

Strathpeffer Spa is situated about twenty-five miles north-west of Inverness, in the county of Ross, and is pleasantly accessible by omnibus or other conveyance, in a drive of four and a-half miles, from the Dingwall Station of the Inverness and Ross-shire railway; or, if the visitor chooses, he may, by changing trains at Dingwall, proceed by the Dingwall and Skye line to the Strathpeffer Station, a mile from the Wells. To the visitor with luggage the drive from Dingwall is more satisfactory with present arrangements. As, however, it has just been determined by the Highland Railway Company to construct a new branch line from Dingwall to the Spa, these directions will soon become obsolete.

Since the latter part of last century the Spa has been much resorted to by health-seekers, chiefly from the more northerly counties of Scotland; but as facilities for travelling by railway have increased, it has become frequented by visitors from all parts of England, Scotland, and Ireland, indeed from all parts of the world, the healing virtues of

its waters, practically demonstrated in numberless cases, forcing it more and more on the attention of those in quest of health. By nature the place is eminently suited for being the resort of invalids. The village, with its hotels and lodging-houses, stands at a height of some 200 feet above the level of the sea, on the slope of the western extremity of the strath, or valley, which is called Strathpeffer, and which runs along the southern base of Ben-Wyvis; the situation being such that by the extension of the new buildings higher up the valley, two different climates may be had, the one of a High, the other of a Low Strathpeffer. Within hearing almost of the calls of pheasants and grouse, it is just on the margin of the grand mountainous district of Ross-shire, a portion of the Scottish Highlands now well-known to every enthusiastic sportsman. Game of all kinds abound in the immediate vicinity of the Spa. The county of Ross contains a number of capital deer forests, and a great many most productive grouse moors; its salmon fishings also are excellent, and it is consequently well dotted over with picturesque shooting lodges.

The natural beauties of Strathpeffer Spa, and the style of the buildings which have sprung up within the last few years, vividly recall reminiscences of some celebrated foreign Spas. Since the Duke and Duchess of Sutherland have directed their attention to its prosperity, it has completely changed, both as regards appearance and accommodation for visitors. Indeed, under the able and tasteful superintendence of her Grace's factor (W. Gunn, Esq.), who resides at the Spa, the whole valley has of recent years assumed quite another aspect. Hotels and lodging-houses yearly increase. A considerable extent of ground immediately adjoining the Wells has been set apart for building purposes; the leases are perpetual, and may be had on favourable terms.

So great has been the influx of health and pleasure-seekers to Strathpeffer, that additional accommodation of a still better kind had become a matter of necessity. The absence of a big hotel was felt to be a want which must be supplied. Some gentlemen acquainted with the merits of the place, and desirous of its success, formed themselves into a Limited Liability Company a few years ago, with the result that there is now in full operation, the commodious hotel, the "Ben-Wyvis," named after the grand and massive mountain of that name, fine views of which are obtained from the windows, which also overlook scenery in hill and glen unsurpassed in Scotland; it is often a pleasing sight in summer to watch the dark shadows of the clouds slowly gliding or chasing each other like giant phantoms across the broadly extended heath-clad declivities of the mountain. Climatic zones under view from the "Ben-Wyvis" range from 30 to 3400 feet above sea-level. The hotel has every modern comfort and convenience, with thorough ventilation and drainage. It stands within its own grounds (about seven acres), which are tastefully laid out, and contain tennis and croquet lawns and bowling green. It is within two minutes' walk of the Spa and Postal Telegraph Office. The "Ben-Wyvis" is specially adapted for a winter and spring residence, being heated by means of Taylor's system of coil pipes, by which an even and comfortable temperature (of about 60° F.) is maintained in the colder seasons; a fact of much importance, as the use of the mineral waters of the Spa in the winter as well as in the summer months is of the utmost advantage. Posting, in connection with the "Ben-Wyvis," is ample and complete, and there is accommodation for the horses and carriages of those who bring their own.

Strathpeffer is a central point from which excursions can

be made to Skye, Strome Ferry, the now famous Loch Maree, Dunrobin Castle, and many other places of interest (see Part II).

The "Strathpeffer" and "Spa" Hotels are well managed and comfortable houses, as is also Macgregor's Private Hotel.

Families preferring private lodgings may find suitable accommodation in comfortable villas.

The village is well sheltered by high hills on the north, south, and west sides, the Ben-Wyvis range of mountains protecting it from the north. In the easterly direction it commands a beautiful view of the cultivated valley, with its wood and heath-clad hills rising on each side. The scenery of the district is of the most varied and picturesque description, combining mountain, loch, river, frith, wood, and cultivated country. The whole neighbourhood is interesting to the geologist, botanist, and entomologist, and from many and many a standpoint is deservedly worthy of the brush of a Millais or a P. Graham. The clearness of the air has at times a peculiar effect in increasing the visibility of objects, producing the impression of nearness. Between the hills, during stillness of the atmosphere, we may remark also that the audibleness of sound is observedly increased. There is the most ample scope, for patients who are able, to benefit by out-door exercise and air. They may enjoy either the lighter amusements of the pleasure grounds connected with the Spa, and an endless variety of walks in the immediate neighbourhood, or, if inclined for more active exercise, they may have it to any extent in rambles among the adjoining hills; however vigorous the pedestrian powers of the visitor may be, every successive day for weeks will find them occupation. There are numerous places admirably suited for pic-nics.

In the event of rain falling, patients may still enjoy the advantages of walking exercise in the Pump-room buildings or under the verandahs. A handsome new Promenade-room or Hall called the Pavilion, has recently been erected opposite the Pump-room. It was opened in the autumn of 1881 by the Duchess of Sutherland, in the presence of the late Lord-Lieutenant of Ross-shire and several thousands of spectators. It is used as a promenade and reading-room, and for dances, concerts, bazaars, lectures, &c., &c. During last season a weekly dance in the building was well attended, the ball at the close being patronised by the leading families of the county. It supplies to Strathpeffer what the Etablissement and Kurhaus are to foreign watering-places. The views from its grounds are very fine. Admission to it is included in the Pump-room tariff.

The Village is well supplied with wholesome water from the heath-clad hills close by, and the sewerage system is thorough, having recently been made so.

Omnibuses run between the Spa and Dingwall Station in connection with *all* trains, during the summer season. Carriages from the principal Hotels generally meet trains at Strathpeffer Station. As already mentioned, however, the Spa will soon be in possession of a branch line for itself.

The Post and Telegraph Office is close to the Pump-room. The Telegraph Office is open on Week-days from 8 A.M. to 8 P.M., and on Sundays from 9 to 10 A.M. Postal despatches, 12-20 P.M., 4 P.M.,* and 10 P.M. Deliveries at 12'45 P.M. and 5'0 P.M.

A Subscription Library, in connection with Messrs. Douglas & Foulis, Edinburgh, is in the charge of Miss Maclean, at the Fancy-goods Bazaar near the Pavilion.

* During the Summer months.

The Spa is 18 hours by rail from London, $8\frac{1}{2}$ from Edinburgh, 8 from Glasgow, 6 from Perth, and $2\frac{1}{2}$ from Strome Ferry. The new line about to be constructed from Aviemore to Inverness will shorten very materially the time for travellers from the south.

CLIMATE.

The climate of Strathpeffer, though a little variable, is eminently salubrious. It may be set down as dry and bracing. In the "Statistical Account of Scotland," for 1841, it is represented as being "one of the purest and most salubrious in Great Britain;" this was the language then of the talented clergyman of the Parish, justifiable at a time when the valley was in great part a jungle, and only partially cultivated, what now may be said when it is beautifully planted and cultivated, and thoroughly drained from one end to the other? For six or seven months of the year one may sit out of doors comfortably till ten at night. Figs come to maturity in the open air in gardens in the district. After rain the soil is very quickly dry, owing to the sloping situation and the absorptive nature of the soil (see Article Geology.) The air of the lower part of the valley is mild and pleasant, that of its higher localities peculiarly bracing and pure, resembling not a little in purity the air of the Engadine, without of course its rarity. Showers are of short duration, and one is rarely kept indoors for any length of time by rain. Thunderstorms are very rare. As regards cold, judging from the writer's own experience, it is felt much more in the centre of England than at Strathpeffer. The people of the district are healthy and long-lived. Consumption among them is a rare disease. High mountain climates like

that on the shoulders of Ben Wyvis have in recent years attracted considerable attention as fit health-resorts for the milder forms of consumption. In the highest inhabited valleys of the Peruvian Andes, consumption is said to be unknown, while the inhabitants of the high Pyrenees, and some of the Swiss Alpine valleys, are remarkably exempt from it—owing, no doubt to the dryness of the soil on the hill-sides, as well as the mountain air. At St. Moritz, where the saying is, that they have nine months' winter and three months's cold, consumption is said to be unknown. The rarity of the atmosphere and frequent climbing promote a greater and therefore a healthier play of the chest and lungs in the oxygenation of the blood. Both inspiration and expiration are facilitated. The chest gymnastics would also liberate from the lungs the tubercular bacilli* discovered by Koch to infest the lungs of consumptives, throwing these organisms to the winds, while the germs of the bacilli like other germs are absent from thorough mountain air, and cannot therefore be inspired, the coldness of the air being at the same time death to the organisms. On the heights also increased magnetic force and a low temperature would exercise a tonic influence on the frame, while more sunlight, which is good for the consumptive, would be obtained. It is well known that an unlimited supply of good and pure air, with warm clothing, are of the utmost importance to the consumptive.

* Microscopic rod-like organisms, which have recently been discovered by Koch of Berlin, to infest in swarms the lungs of consumptive people, and are capable, as well as their germs, of conveying the infection of consumption, by inoculation or infection, to other individuals of susceptible constitution. With germs in general, and worms and their ova, bacilli under different descriptions are among the most terrible scourges which afflict the human family, as well as the lower creation. Modern investigation detects them as the worm at the root in many different diseases. The various parasites which invade the human body produce their own specific morbid symptoms, and have their different especial habitats in the body, as the blood in fever, the lungs in consumption, the glands in scrofula, the throat in diphtheria, the skin in skin diseases, the bowels in intestinal worms, &c., &c.

The district between Strathpeffer and the West Coast of Scotland, some fifty miles, being entirely mountainous, the Spa is well protected from winds charged with moisture from the Atlantic. The cold of the heights condenses the lower invisible vapour of the moisture-laden west wind, causing it to descend at once among the hills as cloud, mist, or rain, in the winter as snow. The air as it comes from west, north, and east is a mixture of mountain and sea air, and therefore free from *dust*, which is mostly composed of organic germs, while the place is too far north for its fresh and pure atmosphere to be tainted in the slightest degree by noxious or fummy emanations from murky towns. The air, in its mixed character, is well adapted for the very weak as well as the more robust invalid.

It has been said, and not untruly, that “no where is the season of spring—everywhere delightful—half so charming as in the Highlands,” and at no time of the day, we would add, so much as *in the early morning*!—in solitude to revel in vernal scene when the new day has just begun.

In Ross-shire, the rate of mortality per annum is sixteen to each thousand of the population, being six less than that of London as London now is. The rainfall in the Strathpeffer district ranges from 25 to 31 inches. The average for England and Wales is 35 inches. The Western Isles, and especially the Skye mountains, contribute greatly in bringing about the comparatively dry climate of Strathpeffer.

RAINFALL OF INLAND WATERING PLACES AND OTHER TOWNS.

The average annual rainfall and number of days on which 1-100th inch or more of rain fell, (calculated from Symons's

British Rainfall for the 12 years, from 1868 to 1879 inclusive)—

		Inches.	Rainy Days.
Dingwall, near Strathpeffer...	...	28'17	146
Bath ... ..	...	33'2	180
Buxton ... ..	...	54'7	211
Cheltenham ... ..	...	31'3	165
Clifton ... ..	...	35'3	174
Great Malvern ... ..	...	31'7	173
Harrogate ... ..	...	33'4	156
Ilkley ... ..	...	41'3	196
Leamington ... ..	...	27'1	169
Nairn* ... ..	...	25'31	185
Matlock ... ..	...	39'0	185
Tunbridge ... ..	...	32'6	165
Braemar ... ..	...	37'52	190
Aberdeen ... ..	...	33'08	221
Glasgow ... ..	...	43'33	217
Edinburgh ... ..	...	28'45	154
Manchester ... ..	...	35'12	210
London ... ..	...	24'04	158
Torquay ... ..	...	...	154
Ventnor ... ..	...	...	152
Hastings ... ..	...	...	152
Pau ... ..	...	...	140
Pisa ... ..	...	...	122

Meteorological observations not having been as yet conducted for any length of time at Strathspeffer, in the above table the calculations are given for the town of Dingwall, at the lower end of the valley of Strathpeffer, and four and a-half miles from the Spa. Possibly the figures may be a shade

*Calculated from the Observations of the Meteorological Council for the 10 years 1870 to 1879 inclusive.

higher for Strathpeffer, though the Spa is better protected from the east wind than Dingwall. It will be seen that while the actual rain-fall in London is remarkably low and less than at Dingwall, yet the number of wet days in London is greater ; which means that the rain falls more heavily at Dingwall but is of shorter duration. The Strathpeffer district has therefore a greater number of clear days overhead than London, without, at the same time, the objectionable smoke, germ dust, and other impurities. This means a greater amount of sunshine, which, with the plentiful and luxuriant vegetation around the Spa, implies a higher amount of ozone, therefore a more salubrious condition of atmosphere, and to mortals higher animal spirits.

It is an act of a diabolical nature on the part of any one with the possibility of the seeds of an infectious disease about him to visit a crowded Spa, communicating infection and spreading disease, and death it may be, right and left of him, not to speak of ruin to the Spa for the remainder of the season. So flagrant a trifling is it with the health and lives of visitors and residents, that it is impossible to speak too strongly on the subject.

MINERAL WATERS.

The Strathpeffer mineral waters are, with the exception of a chalybeate, of the kind called sulphurous, being richly impregnated with sulphuretted hydrogen gas and sulphur. They contain various saline ingredients, and are cold. They have been analysed by Dr. Murray Thomson, late of Edinburgh, Dr. Medlock, of London, the late Dr. Thomson, of Glasgow, and others*. Being sulphurous, they

*The Chalybeate water has been analysed by Dr. Stevenson Macadam, of Edinburgh.

belong to the same class as the sulphur-waters of Harrogate, Moffat, and Aix-la-Chapelle. The sulphur-element, however, in one or other state, enters more largely into them than into any of these. It exists in combination with hydrogen, forming sulphuretted hydrogen gas, and as an element in several sulphate-salts, forming the sulphates of magnesia, lime, and soda, and as a sulphuret in combination with potassium, sodium, and iron, and by itself in a state of suspension. Strathpeffer is unique among the first sulphur Spas of Europe for the quantity and condition of the sulphur-element over and above the sulphuretted hydrogen gas. The presence of fine sulphur in suspension is peculiar to it, and the sulphur so suspended appears to be "crowded out" of chemical combination owing to the amount of it in the water. (See "Origin of Constituents of Sulphur Springs.") By atomic calculation the writer finds that there exist altogether in the water of the Strong Well, the sulphates being taken into consideration (for they contribute to the specific influence of the other sulphureous ingredients), a little over thirty grains of sulphur to the imperial gallon. In the strongest sulphur-water of Harrogate, the quantity of sulphur is some eight grains to the gallon; while in the Moffat water it is little more than two-thirds of a grain, the sulphur in the two last being in combination with hydrogen and sodium only, forming sulphuretted hydrogen gas and sulphuret of sodium. The Aix-la-Chapelle waters contain nine grains of sulphur to the gallon. They, however, are hot, which so far increases their power; but a cold sulphur-water can of course be artificially heated, and its power also so far increased. It may be considered a digression from the rule to include sulphates in estimating the value of a sulphuretted water, but inasmuch as the sulphates of the Strathpeffer springs co-operate with, and aid the other

sulphureous ingredients in their specific effects, they may be considered side by side with the sulphurets and sulphur. In the Strathpeffer water the sulphate of lime as well as the carbonate exists in easily digestible strength, being thoroughly and minutely dissolved, In very minute solution the sulphate of lime is not indigestible, and the water could take up four times the quantity it contains. Carbonic acid in the water holds easily in solution the carbonate of lime. Both the *sulphate* and *carbonate* of lime from their astringency, favour the digestion of the water. The sulphates in the Strathpeffer waters are the sulphates of magnesia, lime, and soda. They all exist in easily digestible quantity, and on being introduced into the system in their feebly diluted state, exert an influence similar to that of the sulphurets and sulphur, thus enhancing the value of the water.

With regard to the quantities of sulphuretted hydrogen gas, it will be seen by reference to the analyses that while the strongest Harrogate water contains 5·31 cubic inches to the gallon, and the Moffat a little over a third of a cubic inch, the Strathpeffer New Well contains 11·26 cubic inches, which is the largest quantity of sulphuretted hydrogen in any known spring in Great Britain. In most of the sulphurous Spas of the Continent comparatively little of this gas is contained, and a water which contains one cubic inch to the pound is considered a strong one. Strathpeffer contains over this quantity. Aix-la-Chapelle contains 9 cubic inches to the gallon, with 0·73 grain of sulphuret of sodium.

The predominating *saline* ingredients in the Strathpeffer waters are, the sulphates of lime, magnesia, and soda, and the carbonate of lime. In the sulphur-waters of Harrogate, Moffat, and Aix-la-Chapelle, the predominating salt is the chloride of sodium (common salt). The salts in the Strath-

peffer springs do not so exist as to render them *very markedly aperient*. The waters are of remarkably low specific gravity, and their action is more especially *on the kidneys*, on which they act with very great energy and promptitude. In this particular, they resemble the weak Moffat sulphur-water, and differ widely from the strongest Harrogate waters, in which the chloride of sodium exists in such abundance as to render them aperient when taken in much smaller quantities. Owing partly, as will be shown farther on, to the Strathpeffer waters being greatly stronger in sulphuric gas in the colder seasons of the year, they are more aperient at these times than in summer. In chemical composition, the Strathpeffer sulphur-water resembles those of Eilsen in North Germany, Nenndorf in Hesse, and Schinznach, the celebrated French resort in Switzerland; it contains, however, according to Dr. Medlock's analyses, three or four times the quantity of carbonic acid gas found in them, rendering it all the more palatable and digestible. The famous sulphur Spa of Aix-les-Bains in Savoy may be superior at present to Strathpeffer for bathing purposes, but the Strathpeffer waters are the more powerful of the two for internal use, the quantity of sulphur in the Aix-les-Bains water is 7 grains, of gas 13 cubic inches to the gallon. The *total* saline ingredients in the waters of Strathpeffer are very much less than in those of Harrogate; the waters are thus of very much less specific gravity. On this account they are easily digested, their special tendency being to be *absorbed* by the stomach and intestines, and received *through the liver* into the general system, the higher dilution, the carbonic acid gas, and the salts of lime and iron favouring this absorption; the tendency of the Harrogate waters on the other hand being, by acting as aperients, to pass through the bowels, and that too though taken in comparatively small quantities.

Owing to the *easy digestibility* of the Strathpeffer waters, and their prompt action on the kidneys, large and frequent draughts of them can be taken ; and the greater the amount received into the system, the greater must be the specific influence of the all-important sulphureous ingredients present in them ; but the writer must not be understood to mean that the greater the amount imbibed, the greater will be the benefit to the patient ; the quantity varies according to the constitution and complaint of the patient, and should always be regulated by a medical man conversant with the effects of the waters.

The Strathpeffer waters are thus not only greatly stronger in sulphur and sulphuretted hydrogen than the strongest of the Harrogate waters, but they can be taken in much larger quantity. They should, therefore, be surpassingly powerful as curative agents in those diseases for which sulphur-waters are generally recommended.

Although the water is at first somewhat repulsive in odour and taste, it soon becomes by a little perseverance quite palatable ; the smell disappears, and to many its sharp coolness* renders it in the heat of summer even refreshing.

"The season " extends from the beginning of May to the end of October, but this is simply the time of year when people generally go from home for change. The various saline ingredients of the springs exist in much the same quantity all the year round, but the important sulphur gas varies in quantity with the seasons of the year, being greater in the colder seasons than in summer. In the spring it is greater than at any other time As far as the water is concerned, it may be drunk with the utmost advantage in the winter as well as in the summer ; indeed, through-

* Owing to the large quantity of carbonic acid gas as well as the low temperature.

out the whole year, the chill at any time being, if required, taken off by the addition, at the time of drinking, of a little hot sulphur or ordinary water. It ought not to be heated over a fire, as the gradual heating dissipates the sulphuretted hydrogen gas. The *steam also* generated in the water fills its minute interstices, and expels the gas. The springs are stronger in sulphur gas in the colder seasons of the year than in summer, inasmuch as *the heat of summer* favours the escape of the gas, while cold confines it. On the morning of November 7th, 1882, with the barometer at 29·4 and the thermometer at 42° F., and after strong frost the previous night, the writer found by a correct process the quantities of sulphuretted hydrogen in the respective springs to be, 16·1 cubic inches to the gallon in the Strong Well, 20·5 in the Upper Well, and 7·5 in the Old Well. On examining again by the very same process on the morning of April 26th, 1883, with the barometer at 29·2 and the thermometer at 43° F., and after a cold night the respective quantities were, for the Strong Well, 22·7; for the Upper Well, 27·1;* for the Old Well, 7·3 cubic inches to the gallon. It thus appears that the Upper and Strong Wells are much influenced by the season of the year. If it be desired to have as much of the sulphur gas as possible, then the colder time of the year, and especially the spring, is the best for taking the waters as well as for having them bottled. But why is there more of the gas in spring? The explanation appears to be that as the hour before sunrise is the coldest in the night, the earth having then reached the limit of its time for parting with heat by radiation, so the time of year before the sun has warmed deeply the earth's

* These figures, obtained be it understood, during the cold time of the year, and giving 3 or 4 grains of pure sulphur extra to the gallon, are much greater than according to the analyses appear with respect to any of the German or French sulphur springs.

surface in our latitude, is the coldest for the springs. In the autumn the cold coming over the earth's surface acts again to confine the gas. The calculations of sulphuretted hydrogen in mineral waters are subject to considerable variations, depending much on temperature, but serving for approximate comparison. The Strathpeffer Upper Well, though the strongest in gas in the colder seasons of the year, is weaker than the Strong Well in summer, because in the heat of summer it does not retain so well its gas. The Strong Well is the strongest of the sulphur springs in "the season," and at that time also much the strongest in Britain in sulphuretted hydrogen gas. As it retains its gas very well, it is the best for bottling when a more or less purely sulphur-water is required. Heat, agitation, and exposure to the air, set the gas free. The Strong Well is a harder water than the Upper, and this may explain the greater hold it has over the gas. An eminent authority on health-resorts says : "There are no springs which cannot be borne in cool air and in severe winter cold ; the effects of the sulphur and the iron are not affected by the coldness of the season."

The water may be sent or taken to a distance, but the sulphur-gas has a tendency to escape even from sealed bottles. The full medicinal advantage is obtained, therefore, only at the Wells.

The different sulphur springs contain much the same chemical ingredients, and differ mainly as to quantities. From the quantity of lime which they contain, they may be classified with what are termed earthy springs, like those of Bath, and Baden in Switzerland, while from the sulphates of magnesia and soda in them, they may also be said to belong to the aperient, bitter, or sulphated class, like that of Friedrichshall, in which, however, the sulphates exist in much larger (purgative) quantity.

There is a well-arranged and superior sulphur bath establishment at the Wells, where ordinary hot, cold, and shower baths may also be had ; also vapour, douche, ascending douche, spray, and wave baths. Sulphur water for the baths is supplied from two large covered-in reservoirs, lately constructed for the reception, all the year round, of the waste water of the several springs. If required, by enlarging these reservoirs, the supply for baths can be increased to any extent. In the Harrogate sulphur waters, common salt exists so largely (800 grains to the gallon), as to render them, when used outwardly, irritating in some skin affections. According to Hebra, a bath which contains a small amount of salt acts as an injurious irritant in eczema. The quantity of salt in the Strathpeffer waters may be set down as almost *nil*, there being only $4\frac{1}{2}$ grains to the gallon. The sulphates, associated as they are with carbonate of lime, and existing in such minute quantity, may also be almost left out of account, especially as the water becomes alkaline as its gas is coming off from the heating. Alkaline baths are softening to the skin, from their saponifying property. The Strathpeffer baths may be set down as sulphureous alkaline increasing the skin's function and softening it. The water being among the strongest in Europe in sulphur, and among the weakest in saline ingredients, is peculiarly suitable both as an external and internal remedy. In the bath, while acting on the skin to increase its function and soften it, it also counteracts any cuticular acidity, and partly owing to its saponifying effect on the oily part of the skin's secretion it causes the skin afterwards to feel velvety.

A new and abundant supply of sulphur water having lately been discovered, an additional range of baths has been constructed. Recent sinking and excavating operations have demonstrated that the upper end of the valley is

actually permeated with sulphur water. Any amount may therefore be had, and new springs may in time be found, better than the old, both for drinking and bathing purposes. Of old, the baths were metallic, which was a chemical mistake ; they are now of clay, lined with porcelain. There are sunk baths, for the use of invalids unable to get into the ordinary kind.

The chalybeate water, brought in iron pipes from Saint's Well, side by side as it now is with the sulphur waters in the Pump-room, is a most valuable acquisition to the Spa, iron being an essential element of the blood, enriching and strengthening it, and at the same time acting as a powerful tonic to the digestive mucous surface, liver, spleen, and skin. "The blood is the life," but in order to "life," both mental and physical, the blood as a rule must be healthy and strong. The iron in the water is obtained from the rocks or soil in the neighbourhood of Saint's Well, near the Raven's Rock, where it occurs in an oxidised state. It forms a carbonate by uniting with the carbonic acid gas which is always present in good spring water.

ORIGIN OF THE CONSTITUENTS OF THE SULPHUR SPRINGS.

These are to be referred, partly to the solvent action of the rain-water, during percolation through hills of calcareo-bituminous rock in the vicinity of the Wells, and partly also to chemical changes occurring among the materials taken up by the water. An analysis of a specimen of the rock by J. Ross, Esq., of Alness, gave the following composition :—

	Per Cent.
Bituminous organic matter and water	4'8
Sulphate of lime	10'3

	Per Cent.
Carbonate of lime	45·0
Carbonate of magnesia	19·1
Carbonate of iron	1·6
Insoluble (silicates, &c.)	18·8
	<hr/>
	99·6

The sulphates of magnesia and soda present in the springs, probably exist in a diffused state in the rocks, their presence in a small specimen not being appreciable. This remark applies undoubtedly to the chloride of sodium. But the sulphate of magnesia may also result, in part, from the decomposition of sulphate of lime and carbonate of magnesia, carbonate of lime being meanwhile also formed. The sulphuretted hydrogen gas is the result of the partial decomposition of the sulphates in the water by the organic matter of the rocks. The carbon of the organic matter unites with the oxygen of the sulphates to form carbonic acid, while the sulphur of the sulphates combines with the different metals to form sulphurets. The sulphurets are then decomposed by the carbonated water (it having this effect), their sulphur combining with the hydrogen of the water to form *sulphuretted hydrogen*, while the metals unite with the oxygen, and form carbonates by union with carbonic acid. The sulphurets in the waters most probably originate in this process, or they, and the sulphur in suspension, may result from the decomposition again of the sulphuretted hydrogen gas. The sulphate of lime (gypsum) would be got chiefly from the rock, but might also result from a decomposition of the sulphur gas. The trace of phosphorus would be derived directly from the Fish-bed Schist, fish yielding this element, though minute quantities of phosphoric acid are met with in almost every spring. Before and during storms the waters

curiously darken, sometimes becoming even inky in appearance, probably from increased evolution of carbonic acid gas (the result of diminished atmospheric pressure) and the formation of the black sulphide of iron. By adding the chalybeate to the sulphur water, a black inky mixture is obtained, from the union of the iron with the sulphur, the black sulphide of iron being the result. In a similar way the motions of the bowels of those taking the *chalybeate water* become dark, owing to chemical union between the iron and sulphur of sulphuretted hydrogen in the bowels, as well as the union of the iron with tannic acid, which occurs in tea, coffee, wine, &c.

ACTION OF THE SULPHUR WATER ON THE SYSTEM.

Being sulphuretted and sulphated, it acts as a stimulant to the involuntary muscular movements of the stomach, and to the involuntary muscular, peristaltic, or worm-like motion of the bowels, by which their contents are propelled. Its coolness, and the presence largely in it of carbonic acid gas would contribute to the natural movements of the stomach. Being of less specific gravity than that of most mineral waters known, it is very easily received (by endosmosis) into the specifically heavier blood. The specific gravities of the different springs vary from 1001 to 1002, ordinary water being 1000, that of blood being on an average 1055. The specific gravity of bile is 1028, of lymph 1037, of the renal excretion 1020, and of the pancreatic juice and saliva about 1008. Received into the general circulation, the water acts as a stimulant to the nervous system and to the skin. In most cases its action on the nervous system is not such as to be "felt" by the drinker, but in some, a distinct feeling of

exhilaration is experienced, while in others, drowsiness some time after partaking of it is most marked. This is caused by the large amount of sulphuretted hydrogen gas, which exists in the colder seasons of the year in more or less narcotic quantity, and other sulphureous ingredients which stimulate the circulation of arterial blood in the brain, aided by the carbonic acid gas, phosphorus, and lime,* the effect being somewhat similar to that of alcohol, or of carbonic acid gas when largely ingested in aerated drinks†. In its action on the skin also, the effects of the water are comparatively seldom such as to be felt, but if a smart walk be taken after drinking, an unwonted feeling of heat with perspiration will, in most cases, be experienced. It has the effect of deriving the blood to the skin, and of stimulating the circulation in it, increasing in so doing the skin's natural excretion. This is the effect mainly of the sulphur-element in the water, and the sulphate-salts in such weak solution contribute to it. When the water enters the general circulation, it acts as a stimulant on involuntary muscular fibre wherever it finds it, in the same way as it acts on the involuntary muscular fibres of the stomach and bowels. While so doing, it also thins or liquefies the comparatively thicker blood, and other fluids of the body as the bile, and the lymph of the absorbent vessels,‡ all of which, as already shown, are specifically

* Juices in the bowels or blood are supposed to decompose sulphurets and develop sulphuretted hydrogen gas. Sulphuretted sulphated waters introduced into the stomach develop a greater amount of the sulphur gas than they originally contained by the decomposition of the sulphates in the bowels, but the gas so generated generally passes as flatus from the bowels.

† During a course of the water, there is a greater or less disposition to sleep, especially in the colder seasons of the year, partly because of the greater amount of sulphuretted hydrogen gas at these times. The sleepiness would also be favoured by increase of carbonic acid in the blood, resulting from the increased waste of tissue which, as we shall see further on, attends the use of the water.

‡ Vessels exceeding in number the veins, but less than them, arising in almost every organ and structure of the body, having small glands in their course, and delivering their contents, the lymph, a kind of rudimentary blood, by two channels into the blood near where that fluid in its circuit enters the heart.

heavier than the water. It thus stimulates and facilitates the onward movement of these fluids. Involuntary muscular fibre, *i.e.*, muscle *not* subject to the will as are the muscles of locomotion, occurs in the coats of the stomach and of the whole intestinal canal, in the windpipe, and bronchial tubes, in the arteries, the lymphatic or absorbent vessels, and in most veins, also in some of the sweat ducts, it is absent in most of the veins of the brain ; it is arranged longitudinally or circularly or both on the coats of the vessels or tubes, and by its contraction promotes the onward movement of their contents, The sulphur element stimulates its contraction. Thus the blood under the influence of the water circulates everywhere more actively. It does so in the brain, it does so in the skin, promoting the skin's natural excretion. But the water also aids in the nutrition of the skin, by supplying it with sulphur—one of the elements of which the skin is composed. The skin is, therefore, not only stimulated in its excreting function, but it is also invigorated, both by the afflux of blood to it, and by the supply of one of the constituents of which it is composed. The writer has frequently observed, during a course of the water, the skin, especially of the hands, to become harder, and its cuticle or outer layer to be shed in "scurf" before the advance of one new and stronger. Over the rest of the body the same process goes on, though rarely in an appreciable degree. On the face, the action of the water is that of a cosmetic. It has been observed by some who have taken it extensively for some time that, on their underclothing being shaken over a fire, the impurities derived from the skin have burned with a blue colour, like particles of the flowers of sulphur, a somewhat extraordinary fact, which proves the strong sulphurous impregnation of the water and its relation to the skin. From the formation of the black sulphide,

silver frequently becomes blackened in the pockets of those taking the water. In the same way, if a lotion of lead be applied to the skin during a course of the water, the skin will be stained black by the formation of the black sulphide of lead. The sulphuretted hydrogen, which is thrown out in part by the skin, becomes decomposed on meeting with the air, its hydrogen combining with the oxygen of the air to form moisture, the sulphur being precipitated pure on the clothes, skin, &c. The sulphur thus finely diffused in the pure state over the surface of the body, acts as a kind of adherent remedy in rheumatism, skin affections, and other diseases. Pure sulphur is deposited visibly, in the same way, on the surface of the water in the Wells, forming what is called the "cream."

So far the water may be said to act as a stimulant at once to the bowels,* the nervous system, and the skin. But it also acts very specially on the kidneys. The circulation of the blood through these glands is facilitated by the stimulating and liquefying properties of the water as already explained. But plain ordinary water received into the system also acts as a stimulant to the kidneys. If however, the ordinary water contains such ingredients as are found in the Strathpeffer waters, and in like quantities, its effect on the kidneys is greatly increased. Some of the Strathpeffer salts are, as procured from the chemist, aperient to the bowels, but combined as they are in the mineral waters with the other salts, and all together existing in such minute quantity, their combined effect is principally on the kidneys, increasing the flow of the urine. On the small sweat-glands of the skin the action is the same—to increase the flow of the perspiration through the sweat-

* Being stronger in sulphur gas in the coldest seasons of the year than in summer, they are more aperient at these times.

ducts or pores. But the Strathpeffer waters, though not usually laxative are, some of them, more or less so.

The proper time for drinking the water is before breakfast and the mid-day meal, and not afterwards.

Another most important effect of the water on the system is the influence it exerts in increasing the general retrogressive metamorphosis of tissue. By *progressive metamorphosis* is meant the change through which the nutritious portion of the food passes in its transition first into blood and then into tissue; by *retrogressive metamorphosis* the degeneration which is continually taking place in the tissues of the body as the result of oxidation and action. The muscles waste by oxidation and usage, and require, therefore, constant repair. Fat is very speedily consumed from the body by oxidation, if no fat-forming elements enter the blood. Now the effect of the considerable quantity of the Strathpeffer water usually taken is to favour the retrogressive metamorphosis rather than progressive formation of tissue, the ultimate consequence of which is, to diminish somewhat the weight of the body. The water dissolves up the waste and wasting material and carries it along with it out of the system in a state of solution, principally by the kidneys and skin. Used up materials circulating with and in the blood must be in a state of solution before they can leave the body.* Food or the nutritious part of it, before it can enter the blood must be in a state of solution.† It is

* The thorough solution of every substance is necessary, in the first place, for nutrition, and in the second, for secretion and excretion. Impurities from waste of tissue increase in the blood of a fasting individual, unless he takes water as a solvent and diuretic to wash them out, and without the water he may in time be partially or completely poisoned by the impurities, while at the same time dying from inanition.

† From its solvent action on our food ordinary water taken freely acts as a promoter of the healthy formation of blood, and through the blood, of the tissues of the body, the tissues imbibing their nourishment from the blood-vessels or blood-carriers. It favours healthy *progressive change*, and in this way tends to prevent the formation of uric acid, the deadly enemy of the wealthy and luxurious, inasmuch as it is the materies morbi in gout. Taken, however in *very large quantity*, water does not all the more favour progressive change, it rather strongly stimulates the retrogressive metamorphosis of tissue. Water acts on the body generally, much in the same way as exercise. Both are good for the gouty.

dissolved specially by the gastric juice, and is diluted by the fluids taken along with it. The effect of large quantities of *ordinary water* is a little similar to that of the mineral water, in so far as the oxidation of tissue is facilitated by the blood being diluted and thinner. But the sulphur water is a stimulant to its own absorption at the bowel. It stimulates directly its own propulsion along the alimentary tube, thus spreading itself out along its absorbing inner membrane, it stimulates directly the absorbing muscularity of the four millions of human rootlets projecting from the interior of that membrane. On being absorbed it courses along a large vein, called the *vena portæ*, to the liver. The walls of this vein are plentifully supplied with involuntary muscular fibre which it stimulates. Passing through successively the liver, the right side of the heart and lungs, it enters the arterial system acting as a *general arterial stimulant*. By causing a more energetic *arterial* circulation in the lining membrane of the bowel it favours the absorptive function of the bowel. Through the general arterial system it reaches the kidneys and skin on which it chiefly acts as a stimulant to its own elimination from the system. It can thus be taken in considerable and oft-repeated quantity, acting as a diluent and stimulant to the whole blood system ; but while circulating with the blood it communicates a *stimulating liquidity* to other fluids which are dependent on the blood for their liquidity, such as the bile in the bile-ducts, the lymph in the lymphatic vessels, the perspiration in its millions of pores,* the gastric juice and gastro-intestinal mucous in their countless thousands of tubes, and the salivary and pancreatic secretions in their ducts, enabling all to dissolve up, or wash away crude impurities and concretions which from pernicious

* In the skin of an ordinary-sized man there are seven millions of pores, which if laid end to end would stretch a distance of 28 miles.

causes may have arisen; or to float away it may be, collections of deadly bacilli or germs, or other minute obnoxious matters, carrying them to the proper excrementitious outlets. Organisms in lively *action* would enter or leave the body not by solution but by their own action. When crudities or sedimentary formations, giving rise to irritation and disease, occur in the blood, urine, sweat, bile, or other fluids of the body, they are the result frequently of *imperfect dilution*, or physical influences, such as cold, heat, or wet, or over-eating, causing strain or congestions of the stomach, liver, bowels, kidneys, &c., and so disturbing the healthy chemical conditions of the ordinary ingredients of the associated fluids. Sometimes a nervous influence is at work disturbing the healthy balance. By stimulating the tension of the blood vessels, and quickening capillary circulation everywhere, the sulphur water promotes a greater degeneration of tissue than ordinary water.* I believe it is not precisely ascertained how far sulphuretted hydrogen gas favours directly the retrogressive metamorphosis of tissue. Partially used up blood-corpuscles and muscle may have their disorganization accelerated by the union of the sulphur of the gas with the iron which they contain.†

THE MEDICINAL PROPERTIES OF THE WATER.

If the substance of the last chapter be fully borne in mind, it will not be difficult to understand in what cases the water may be useful as a medicine. One of the earliest and

* Urea is the most important representative of the final result yielded by the retrogressive metamorphosis of tissue.

† During a course of sulphur water of fair strength, the motions of the bowels are darker than usual. It is supposed that the sulphuretted hydrogen while in the portal vein gives up part of its sulphur to old blood-corpuscles, which the spleen in its function has failed to disintegrate, causing the conversion of their iron into the black sulphide of that metal, which then colours the bile, and the motions of the bowels. The disintegration of the gas, on the other hand, in this way is adduced as an explanation of how it is that its poisonous properties are evinced when largely inhaled, not when ingested.

most marked effects accompanying a course of it, is a quickening of the appetite, and this it may be said, takes place in every instance in which the water is fully admissible. It is no exaggeration to say, that persons who can take the water freely, with outdoor exercise, consume as a rule, from twice to four times their ordinary quantity of food. A stimulant influence being exerted by it on the presiding nervous system, functional energy is thus excited in the organs of digestion. But its effect on the general system being, as has been already shown, to increase the general waste of tissue, increase of appetite results, in order to the compensation of this waste ; while increased excretion from the skin, kidneys, and lungs,* stimulates to increased absorption at the bowel, as exhalation from the leaves of plants stimulates to absorption at their roots. The waste of tissue caused by the large use of ordinary water resembles that caused by respiration, and is greatest in the case of structures feebly organised, such as fat and the weakly vitalised effused formations of disease.

In the many forms of deranged and painful digestion (dyspepsia), and diseases resulting therefrom, the use of the Strathpeffer water is attended with the best results. Other causes besides the above operate in the production of such results. The water, while exerting a stimulant action on the stomach and bowels, in the propulsion of their contents,† and acting to some extent as a laxative, also fluidifies, and so facilitates the flow of the bile (nature's own aperient), the due elimination of which from the liver *into the bowel* is essential to healthy digestion, and we have already seen that in acting as a general arterial stimulant it favours the natural absorptive function of the bowel. At the same time, the

* They give off more water.

† Muscular inability is a frequent cause of bilious disorders.

change of air and scene, the freedom from business, and the outdoor amusements and exercise, from the stimulus they afford to the presiding nervous system, and to the system in general (the liver in particular), play no unimportant part, by causing the blood to circulate more briskly through its accustomed channels. "Poor eaters" coming to the Spa are better not to have "something on their minds." Care ought to be left behind. That the water by itself is effectual in quickening the appetite and improving digestion, is attested by the fact that the people of the district, and others at a distance to whom it is sent, experience these effects from its use. In order, however, to permanent good, care should be taken both as regards quantity and quality of food. The greatest advantage also results from the use of the water in such affections of the liver as are of a curable nature. During the natural process of digestion, the dissolved parts of the food, on being absorbed by the bowel, mix with the blood of a large, too often overloaded* vein (the portal), by which they are conducted to the liver, there, while circulating through it, to be acted upon, so as to be fitted for nourishing the body previous to entering the general circulation; the fatty matters being nearly all conveyed to the blood by a different channel called the thoracic duct. A quickened digestion, following upon increased appetite, must therefore cause increased action in the liver, the circulation through it being meanwhile repeatedly facilitated by the water (as oft as it is drunk), acting as a *diluent* to the blood of the portal vein—for *the water*, on its absorption, is conveyed to the liver by this vein, and it stimulates as already noticed the muscular action of the vessel. Sluggish conditions of the liver are in this way improved, and abdominal

* Overloaded too often by immoderate eating or drinking, or both, or pressed upon by the overloaded viscera.

venous fullness counteracted. Sulphur waters like those of Strathpeffer are particularly useful in cases of stagnation of the portal blood-system, in enlargement of the liver, and fatty liver. The liver tends to become enervated and collapsed by studious and sedentary occupations, and loaded, or more or less blocked by ease and luxury, and such conditions of the organ give rise to innumerable dyspeptic woes, such as palpitation, intermission of the heart's action, dizziness, headache, pains everywhere, low spirits, disinclination to do anything, &c., &c. Muscular exercise tends to counteract a stagnant condition of liver-circulation, and at the same time promotes a more thorough oxygenation of the blood. In the affection called "piles," which is the result of a dilated condition of what are called the hæmorrhoidal veins, the use of the water is frequently of much service, the dilated state of these veins being almost invariably the result of sluggishness of the liver, or habitually constipated bowels, or both conditions combined. The improved state of the abdominal organs following a course of the Strathpeffer water, is a preventive against possible diabetes, resulting from chronic disorder, and consequent irritability in them. Affections of the brain and spinal cord which depend on abdominal irritation would be prevented in the same way; also that terrible suffocative breast-pang called angina pectoris. In many cases by acting on the muscular coat of the bowel as a stimulating aperient for weeks at a time in prolonged course, the water brings about a permanent contraction or tone in a previously distended, sluggish, or muscularly weak alimentary canal, and it acts in a similar manner on other tubes in the economy which are furnished with involuntary muscular fibre and have lost tone. "A specific influence" over the liver and hæmorrhoidal veins, is ascribed by Professor Pereira to sulphuretted hydrogen water. The moving force

of the blood through the portal system of veins (liver circulation) is augmented in the case of the Strathpeffer water by its *diluent* and *stimulating* properties. It is well known to German physicians that enlarged livers undergo diminution under the continued use of sulphur-waters. The writer has seen many apparently hopeless cases of enlargement of the liver cured at Strathpeffer. The water while acting as a diluent to its fluids, and as a stimulant to the portal vein, favours the retrogressive metamorphosis of morbid effusion (if it exists), in the structure of the gland.*

In cases where the bile, which is secreted by the liver, and is a somewhat viscid fluid, may have difficulty in finding its way from the liver into the bowel, it is evident that the water, by acting as a diluent to the fluids of the liver, will tend to favour its flow, and so be useful *in jaundice*. The most frequent cause of jaundice is cold affecting the lining membrane of the duct (about the diameter of a goose-quill) which conveys the bile from the gall-bladder to the bowel. The calibre of the duct is diminished, or it may be, completely blocked. By and by we shall see that one effect of a course of the water is to enable the body not only to resist cold, but to expel diseases brought on by cold. While acting therefore as a diluent to the thickish bile, it is at the same time engaged in throwing off the cold which has been the cause of the stoppage of the flow. Sometimes a gall-stone in the duct or one of its branches, *giving rise to great pain*, is the cause of the stoppage of the bile-flow. In such cases the action of the water would be mechanically to force the stone down along the duct into the bowel, and so effect a cure. The possibility of the solution of a gall-stone is considered out of the question. Gall-stones are formed princi-

* By adding a little common salt to the water the retrogressive metamorphosis of diseased exudation is quickened.

pally of cholesterine, or solidified bile ; the diluent property of the water would prevent their formation. Here it may be mentioned that the spleen returns its venous blood to the system through the liver. The sulphur-water facilitates the liver-circulation, therefore it tends to relieve a blocked spleen, it stimulates also the activity of the blood-returning vessel.

In cases generally of "sluggish liver" the water by causing increased action of that organ will in this way cause *increased formation of bile*, facilitating at the same time, as we have already pointed out, the flow of the bile from the liver into the bowels.

The writer has seen the use of the water of great service in "chylous urine."

In *scrofulous affections* generally, the use of some of the springs is attended with the best results. These affections are accompanied by debility, an unhealthy condition of the blood, and a faulty digestion. There is a lack of iron also in the blood, it is habitually thinner than it ought to be. Now under the influence of the water, digestion being as we have seen improved, and there being a strong, pure, well ozonised air to breathe, a healthier condition of blood than before is brought about. Both scrofulous affections and consumption are accompanied by morbid deposits in the system. In consumption the unhealthy deposit takes place in the lungs; in scrofula, the glands of the neck and abdomen, the bones, eyes, and other parts of the body are affected. The deposit has the same character in both forms of disease, and its tendency is to increase in size unless arrested in its progress by treatment, or got rid of from the system. The newest information that we have on the nature of the deposits is that they are largely composed of bacilli and their spores, which have got into the blood, multiplying steadily in it until

the special morbid condition of the system has been brought about. These bacilli act as a blood poison, and they are recognised as the bacilli of tubercle; they poison the blood, and with it the general system. Now, it has been already shown that the effect of the water is to *stimulate and facilitate the circulation of the absorbent system of vessels, and of the arterial and venous systems*. If in a congested state of any structure of the body, and therefore a stagnant condition of the blood thereat, or if from general debility in an individual and therefore a sluggish circulation in that individual, the bacilli in the fluids *become deposited*, they will in the latter case come to rest in their favourite habitats, and there mature, fructify, and multiply. It is when they can settle down or stick in a sluggish absorbent gland, or in congested lung-tissue, or other congested structure, that they begin to multiply, living on the particular structure, like cheese-mites, irritating, inflaming, and destroying it, while swarms of new germs are constantly been thrown off into the circulating fluids, each germ ready to settle wherever it can find a congenial home, to fructify and multiply and give off fresh swarms to those pre-existing. The effect of the water would be, while improving the condition of the blood, to give them *no rest*, but to throw them on nature's emunctories, on which, as has been already shown the water acts so effectively. It would make shortest work with them in the case of open scrofulous sores, where nature had already opened *safe* artificial doors for their exit; it would act also, as explained, as a skin restorer and invigorator at the seat of the sores. At Strathpeffer, as before mentioned, the lung-play in walks and hill-climbing would favour the expulsion of the bacilli from the lungs, as well as their non-rest in the circulatory systems. The deposited material wherever present, if not arrested in its increase, or got rid of from the system, tends

at length, by acting as a foreign body, to produce a sore, and to be discharged, where this is possible, in a broken-up state along with the discharges of the sore. When the deposition occurs in the glands or bones, the use of the water is often attended, as has been said, with the best results ; but if it occurs in the lungs, in other words, if the case is one of consumption, *experience* has shown its internal use to be attended with the worst consequences. Visitors who may come to the Spa, with symptoms of consumption, are cautioned by the people of the place against *drinking* the sulphur water. From accounts gathered, its tendency in these cases would appear to be, to cause *exhausting waste* of the tissues of the body, more especially of the fat, also perhaps of the corpuscles of the blood, the waste caused by it being always greater in weakly than in more robust individuals. In consumption, the lung tissue is pressed upon by the tubercular deposits ; its vitality is thus weakened, it is therefore more easily broken down by the retrogressive action of the water, the tendency to blood-spitting being thus increased. At the same time the circulation of the blood through the lungs is more or less impeded by the deposits, according to the mildness or the severity of the case. Large quantities of the water received into the blood increase the volume of it destined so to circulate. The tension of the blood vessels conveying the blood to and through the lungs, would be strained. Diseased vessels in the lungs might give way. The previously enfeebled muscular tissue of the conducting vessels would be over-taxed. Turgescence in them would cause congestion behind them, *i.e.*, in the liver and bowels, disturbing the already weakened digestion, and inducing further emaciation. The water would also tend to increase the sweating and diarrhoea which usually attend consumption. One of the purposes of the lungs in the

economy is, to eliminate from the blood carbonic acid. Under the influence of the water, the amount of this acid in the blood is increased, as the result of increased waste of tissue. Increased eliminating work would, therefore, be required of the lungs. But the sulphuretted hydrogen is also in part thrown off by the lungs. Too much eliminating work being thus thrown on the already diseased organs, would tend to induce congestive or inflammatory afflux of nutrient blood to their healthy parts, and so to aggravate the symptoms. Possibly the water also taken cold, might throw the blood to some extent from the lower parts of the lungs on the upper, where localized consumption is usually present. In any inflammatory affection of the lungs the internal use of the water is for the reasons just mentioned, contra-indicated. But although the internal use of it in the ordinary way is forbidden, the writer has recently found that *the inhalation of the vapour*, charged with the sulphur gas from the water made hot by admixture with boiling water, is a most effective expectorant in chronic bronchitis as well as in incipient consumption, and he knows of nothing at all equal to it in this respect; the action of the sulphur element being, by stimulating the muscular tissue of the smaller blood vessels of the bronchial mucuous membrane, to quicken the sluggish *capillary* circulation, while by the vapour the morbid secretion is rendered thinner, and less tenacious, and is thus more easily coughed up; the ejecting motion of the brush-like cilia (microscopic lung-cleaners on the mucous membrane), would at the same time be facilitated. On the same principle, the writer finds the use of the sulphuretted *vapour* of the utmost benefit in chronic inflammatory affections of the nose, the throat, and the wind-pipe, and of the eustachian tube and external ear giving rise to deafness. Applied by means of a douche or cup, the water is also useful in inflammatory affections of the

eyes. Some special apparatus have been devised by the writer for its use in the above mentioned complaints. Thus, though the Strathpeffer waters are worse than useless, if taken internally in affections of the chest, they are yet most valuable if in the form of vapour they are *inhaled*. Strathpeffer, therefore, instead of being avoided by the delicate in lung, should for these and other reasons be their rallying place. The warm sulphur baths, if carefully used, are most useful in inflammatory affections of the lungs and incipient consumption. In localized rheumatism, and in congestions of the skin, the sulphur water may be applied locally in compress or steam or spray.

Until the recent discoveries of Koch, scrofulous affections and consumption were considered *to depend on* the deposition from the blood of unhealthy and feebly-vitalised material in the process of nutrition. We have now to look upon them in connection with the bacillus of tubercle. The old treatment for them both would apply still, though, no doubt, it will soon be modified or superseded. In scrofula, what was aimed at, was the improvement of the condition of the blood and the stimulation of the absorbent vessels; iron and iodine were the chief medicinal remedies, the former improving the blood, and the latter acting on the absorbents to increase their energy. Both these conditions are, as already explained, in a more excellent way fulfilled by the sulphur waters of Strathpeffer, and the facilities which the Spa affords for out-door exercise* in a well-oxygenated air. In consumption, iron again, on the same principle, with cod-liver oil and phosphorus, to improve nutrition and the state of the nervous system, were the chief remedies.

With a most salubrious climate (see Climate, page 7), second

* Physical exercise promotes the flow of the lymph in the absorbent vessels as well as of the blood in the arteries and veins.

to none in Europe for its general invigorating power, and a water well charged with iron, as is the chalybeate of Strathpeffer, with the facilities afforded for the inhalation of sulphuretted hydrogen vapour, with the fine warm sulphur baths at command, and splendid scope for chest and limb gymnastics, why should not a summer visit to the Spa be eminently serviceable, especially where consumption is *only feared* or suspected, or even further advanced? A course of the iron water, *with hot sulphur baths*, and perhaps an occasional sip of the weakest sulphur water* (not close on the iron), would unquestionably tend *to prevent* the settlement of the disease on the chest. By diluting the blood with oft repeated smaller quantities of the iron water, the circulation through the absorbents and the blood vessels would be improved similarly as by the sulphur water, while the iron would act as an improver of the condition of the blood. Strathpeffer cannot be too strongly recommended to the weakly.

It is, however, for the cure and alleviation of chronic rheumatic affections, chronic and rheumatic gout, and obstinate cutaneous diseases, that these waters have been, and are at present, more especially renowned. The grand indications to be fulfilled in the treatment of these diseases, speaking generally, being, to obtain a healthy digestion, with increased excretory energy, it must be evident, from what has been already said, regarding the action of the waters on the digestive organs, skin, and kidneys, that they are admirably adapted to meet these requirements. From experiments by Dr. Mosler, of Giessen, both with ordinary water, and

* The sulphate and carbonate of lime, like the hypophosphites, are useful where there may be some tendency to consumption. The waters of Lippspringe in Prussian Westphalia, which contain lime principally with nitrogen, are very useful in bronchial irritation and incipient consumption. The climate of Lippspringe resembles much that of Strathpeffer, and the place stands at the same height above the level of the sea as would be a High Strathpeffer with its buildings advanced in the direction of the Spa Hotel.

with the bitter water of Friedrichshall, we may safely conclude that the effect of the Strathpeffer water is, apart from its carbonate of lime, and, notwithstanding increase in the carbonic acid which is eliminated by the lungs and skin, to diminish acidity in the blood—an accompaniment of both gout and rheumatism, uric acid occurring in excess in the former, lactic or other allied acid being present in the latter. In his report on the Strathpeffer waters, Dr. Medlock, of London, says—"Being, moreover, strongly alkaline, their value is greatly enhanced." Dr. Murray Thomson found the springs neutral, the Upper Well but slightly reddening blue litmus paper. Dr. Medlock's analyses were conducted in London in the summer time, a month after the samples were sent him. The truth is, the waters all become alkaline if the sulphur gas escapes, and it very easily does so, as already mentioned. Sulphuretted hydrogen (sometimes called hydro-sulphuric *acid*), itself possesses the properties of an acid, its solution in water reddening litmus paper. In the blood it keeps to itself for a time, allowing the alkalinity of the water to counteract acidity. The lime in the water acts as a remover of acidity. The waters are useful in gout and rheumatism, both because of their action on the skin and kidneys, and their alkalinity on the speedy elimination of the gas from the warm body by the skin and lungs. (Alkaline waters used internally are soothing to mucous membranes).

The writer has very often observed gouty deposits, and those of rheumatic gout, causing enlargements of the joints, undergo diminution under the use of the water, until no trace of enlargement could be recognised. Hot* sulphur-water douches to the thickened

* Heat promotes absorption by separating the atoms of the depositions.

joints, in such cases, act as valuable auxiliaries, by stimulating the circulation of the blood in the parts, and so favouring the absorption of the morbid deposits, the water drunk meanwhile promoting the retrogressive metamorphosis of the diseased structures. *Judicious* kneading and rubbing of the affected parts are also of use. As already noticed, the fine pure sulphur which the water deposits on the clothes and skin, acts beneficially in the diseases just mentioned.

The great efficiency of sulphur water in skin diseases is well known. How often are *they* the result of dyspepsia or gout, of syphilis or scrofula, or some morbid state of the blood. Sometimes the skin alone may be at fault, at other times the kidneys alone, but very often it is the digestive mucous tract, the functional activity of each and all of which we have seen that the water powerfully increases. The presiding nervous system also, if enfeebled, would in each case make matters worse, a loss of nervous power being occasionally the only cause to which diseases of the skin can be attributed. Now, the water acts at once as a stimulant to the presiding nervous system, as a thorough corrective of impaired function in the digestive canal and liver, and as a purifier of the blood. "Most of the diseases of the skin," says Dr. Copland in his "Dictionary of Practical Medicine," "especially those which are most disposed to become chronic, are induced, or perpetuated, or both, not only by impaired depurating function of the skin and its follicles, but more especially and remarkably also, by imperfect action of the kidneys, and of the intestinal mucous surface and follicles; the effete and nitrogenised elements and materials, and their combinations, *retained and accumulating in the blood*, irritating the cutaneous capillaries of predisposed and sensitive surfaces and tissues." Very many cases might be adduced to prove the remarkable curative power of the Strathpeffer

waters in the above complaints. Provided they are fully admissible, and have fair play under judicious medical advice, their employment can scarcely fail, sooner or later, to be productive of good, while, by combining their external application in the form of bath with their internal use, their curative powers are much increased. (See chapter "Action of the sulphur water on the system.") Warm sulphur baths are peculiarly exhilarating, and at the same time stimulating to the skin.

The tendency of the water also is to leave a permanently good effect in those diseases for which it is properly employed.

During winter, warm baths of the water are especially indicated. "Wild bäder" are among the specialties of Baden-Baden. These are marble basins filled with mineral water, and containing a quantity of sand and finely powdered granite, with which the bather rubs the surface of the body, and so increases the amount of that skin-stimulation which is one of the main objects of baths of all kinds. Strathpeffer valley abounds in both fine and rough sand which may some day be made use of in this way.

Mr. Sherlock, in his series of "Hints for the Holidays," says:—"Our own eyes have seen naturally strong men bowed down and crippled with rheumatism, who were almost daily gaining strength and elasticity of limb at Strathpeffer." Patients, however, whose systems are surcharged with morbid material, must not expect great benefit from a short trial of the water. Patience in such cases must be exercised. The water must be allowed *its* time, nor must too great doses be taken because of only a short visit. It is a great and dangerous mistake to drink enormously of the water because the visitor "must make the most of his time." There should be no hurry if a cure is to be effected.

But when in any case a prolonged use of it is required,

it is by no means necessary that the patient make a continuous stay at the Wells. He may, *with benefit to himself*, occasionally intermit for a time its use, and take a course of the chalybeate water if so advised by his medical attendant, or return home, or go and enjoy other changes of air. In the last case, he might take a run through the western hills of Ross, by the grandly picturesque Dingwall and Skye Railway to Loch Maree, unsurpassed in wildness and grandeur by any freshwater loch in Scotland (visited by the Queen in 1877); or make a visit to the sublime grandeurs and other attractions of Skye; or to Cromarty, the native place of Hugh Miller, and the district around, where, as a mason, he commenced his illustrious career, and accumulated the materials of his "Old Red Sandstone;" or make a tour through the glorious mountain scenery of Sutherlandshire; or have a trip through mountain and flood by the Caledonian Canal.

During a continuous course of the sulphur water, although the consumption of food is much increased, the weight of the body is, as a rule, more or less diminished; but when its use is left off, the weight of the body rapidly increases, repair gaining ground over waste, while the functions of the various organs previously acted on continue still to be performed with increased energy. It very frequently happens that more good is experienced *after*, than *during* the use of the water. In very inveterate cases, successive annual courses of it might be necessary, in order to a complete and permanent cure. A single course should, as a rule, extend to about six weeks. In some inveterate cases of psoriasis, we have found it necessary to accompany or alternate the water treatment with medical treatment.

After a course of the sulphur water the use of the chalybeate is of great service during the reparative

process just alluded to, as the digestive organs are then in vigorous condition for the assimilation both of it and other constituents of the blood from the food taken. Its use is indicated for "growing" people who are sickly often and pale, owing to the derivation of the iron of the blood into the muscles.

Syphilitic affections, owing to the expulsive energy of the sulphur water, as at Nenndorf, frequently appear aggravated by it at first, but its use being still persevered with, they generally ultimately succumb. It is sometimes useful as a diagnostic in this way in obscure syphilitic conditions.

Patients afflicted with diseases of the skin should not be discouraged if sometimes the disease appears aggravated at first ; the aggravated condition only proves that the water is *throwing out the materies morbi* from the system, and that an ultimate cure may the more certainly be expected. In rheumatoid affections also, when the water is beginning to take effect in evicting the complaint, increased pain is sometimes experienced. This also is a good sign. In gravelly deposits, and inflammatory affections of the urinary passages, the employment of the water is attended with the best results. From what has been already said this will be readily understood. The urine, highly diluted by the water, is less irritating to the passages, while any congested condition that may exist in them is corrected by the improved tone of the associated minute blood vessels. Small urinary calculi, like gall-stones, are frequently dislodged, and got rid of mechanically under its influence. Owing to its influence on the digestive organs and skin it acts *as a permanent preventive* to the formation of both urinary and biliary calculi, and is much to be recommended after operation for "stone" in the bladder, or the passing of gall-stones. In diseases of the bones, and in white swelling, its curative powers are indeed

marvellous ; and here the salts of lime and the phosphate salt* play an important part, they being naturally and largely used in the economy for the building up of bone. In most cases of bone disease, the *previous sanguification* has been at a low ebb. The water, by thoroughly rousing the digestive powers, brings about a new and healthy blood, which carries with it the requisite materials for the formation of new bone ; and, while improving sanguification, it is busy also in dissolving down and washing away old diseased bone structure. It effects the deposition of new animal matter necessary as the foundation of bone, and the union with it of the essential earthy salts to harden it. In the disease of children called rickets, in which the bones of the body are too soft, lime is *defectively absorbed* into the blood from the food. The waters supply lime in their own composition and improve the digestion of lime-containing food. In rickets, therefore, the use of the water is of much service. Where a diseased condition of bone or other tissue may be considered to depend on gout, or rheumatism, or scrofula, or syphilis, or mercury, or a combination of two or more of these, the use of the water will be found of much value. It is of great service in disease of the hip joint if not too far advanced or complicated with lung disease. In cases of nervous exhaustion, a sojourn at the Spa, with the use, in some cases of the chalybeate, and in others of the sulphur water, is accompanied with great good.

The tendency of the sulphur water to leave a *permanently good effect* in those diseases for which it is generally used has been already mentioned. This must be referred to the invigorating influence exerted by it on the skin, and on the whole system by the new nutrition and tone which have

* See Analyses.

been simultaneously brought about. Its internal action is generally powerfully assisted by its external application in the form of bath. A naturally weak skin, or powerful external influences bearing on a strong one, are much more frequent causes of disease than is generally imagined. Damp tends to obstruct the cutaneous excretion, cold to stop it, and to drive the blood from the surface to the interior of the body. If the excretion of the skin is obstructed, compensating action is required in the other eliminating organs of the body—the lungs, liver, digestive canal, and kidneys, and if cold has also operated, and reaction been defeated, the weaker of these in the individual case, being already more or less surcharged with blood, and having their own and the compensating function to perform, would give way, congestion or inflammation being the result. If damp alone has operated, there might still be more work for the other organs to accomplish than the weaker of them could manage, and the same results would follow. The yielding of the liver, or digestive canal, would give rise to irregular digestion, liver affection, or diarrhoea; of the lungs, to a “cold,” or to inflammation of the air-passages; of the kidneys, to disease of these organs. In chronic rheumatism, the parts affected are the denser tissues of the body, such as the coverings of the muscles, their tendons, the coverings of bones and nerves,* and the ligaments of joints; the poisonous cutaneous excretion is thrown back on these, and irritates or inflames them. Now, the tendency of the water is, to cause invigoration of the skin, and by training the blood to circulate freely in it, to give it permanent strength to resist trying external influences, and so to defend the body against many

* If the *trunk* of a nerve is attacked, pain is felt *beyond* the affected part, causing neuralgia, sciatica, &c.

or most of the ills to which flesh is heir. In this way, it enables the body to resist the effects of winter, and not to resist only, but also to expel many of the diseases attributable to the inclemency of that season. The skin of the body is its natural fortress. The stronger the fort the safer the garrison. The thick-skinned individual gets through life, as a rule, more comfortably than the thin-skinned. A strong, thick scull is a valuable possession at times when it has to withstand a serious bump; but a substantial skin is always serviceable, it keeps the body cool in summer, in winter it keeps the cold at bay. How? Because evaporation is one of the sources of cold. Evaporation from the skin is constantly going on, either from *insensible* and invisible perspiration, or from *sensible* and visible perspiration in the form of sweat. The summer perspiration by its evaporation keeps the body cool. In the strong skin also the blood circulates vigorously, and keeps the excretory functions active. Cold, which causes contraction of everything, cannot easily stop the function of the robust skin and throw the blood inwards as well as the excretory function on the other internal eliminating organs, which might in them set up "cold," congestion, or inflammation. The skin, as nature's bulwark, is supplied with seven millions of pores, partly for the defence of the body against too great heat, and with countless millions of minute (capillary) blood vessels, to strengthen it to resist cold and give energy in its duty in discharging the perspiration from the body. The pores are so many millions of microscopic needle-guns. The morning "tub" acting from without, cleanses the smoke from their muzzles and smartens their tone, but it cannot, like the sulphur-draught so effectively strengthen and cleanse them, acting as it does on their whole length from within out. This strengthening of the skin furthers vigorous growth of the hair and nails.

Owing, no doubt, to the influence of the water in improving the state of the blood, and in stimulating and invigorating the skin, its use in ulcers and other ill-conditioned sores is attended with the best results. The writer has been repeatedly much struck with the speedy healing influence exerted by it in ulcers of the leg, depending on a varicose state of the veins, and that too in cases which for months previously had baffled all the ordinary methods of treatment. Most of the veins, especially those of the lower extremities, are provided with valves, contrived so as to prevent the reflux of the blood as it is ascending towards the heart. The sulphur element, by acting as a contracter of the veins, aids these valves in their work, when from increased calibre of the vessels, the valves are becoming inefficient. In prolonged course the waters are most useful in varicosity of the spermatic, prostatic, and (as already mentioned) hæmorrhoidal veins. Among other cases of ulcer which came under the writer's care last season was one of lupoid ulcer, of the size and depth of a florin, on the temple, which had resisted every kind of treatment at the hands of specialists and others for over 30 years (exactly 32 years). It was just about healed at the end of 3 weeks (when the patient had to leave) by the use of the water locally and internally. From former experiences the cure would most probably be completed in a fortnight after the patient left ; he was lately reported quite cured.

In chronic metallic poisoning the tendency of the water would be to eliminate the poison and promote recovery ; soluble poisons are dissolved up by it and thrown out of the system ; poisons not soluble would be removed mechanically where possible with the débris of the broken down structures around them the result of retrogressive metamorphosis of tissue. The water, as might be expected, is useful in

mercurial syphilis. While mixed with the blood in the general circulation it dissolves well up any irritating material which an incapable digestive process may have furnished to the blood (as for example the *materies morbi* of rheumatic gout), and so enables the material the less irritatingly to pass through capillary blood vessels anywhere, and to leave the body also easily in the state of higher dilution through the various emunctories. At the same time, by rectifying the digestive functions and favouring assimilation, it prevents the introduction into the blood of fresh irritating material, and a permanently good influence being at length left on the digestive organs, skin, and kidneys, a permanently healthy blood is the result, while the old products of disease are removed by improved absorption. The water is also most effective as a restorative, where the system has suffered from the abuse of tobacco, in any case also of "want of tone," or where the individual complains of being "below par." It is a useful remedy against the constant use of stimulants in chronic dyspepsia. From what has been said regarding its whole physiological action, there can be no question but that repeated courses of it, during the lives even of the healthy, favour longevity.

Having thus attempted an explanation of the therapeutic action of the sulphur water, I now sum up with a list of the principal diseases for which its use cannot be too highly extolled. They are—uneasy, heavy and painful digestion, tenderness of the bowels*, want of appetite, bilious conditions,

* The water is well borne by the most tender bowels, acting if desired as an aperient entirely without pain. It is most satisfactory as a curative agent for what is called gastro-intestinal catarrh, which is a congested irritable condition of the lining membrane of the stomach and bowels, giving rise to much distressing pain with depression, and slimy evacuations from the bowels. The writer has frequently seen its prolonged use followed by the happiest results in the chronic state of this disease (gastro-intestinal enteritis), which is sometimes so depressing to the individual, as to alter his character, converting him from having been a lively, sparkling wit it may be, into a dull, stupid, grumbling, morbid, unsociable dyspeptic.

sluggish liver, enlarged liver, "Indian liver," all curable affections of the liver, fatty liver, constipation, the affection called "piles," jaundice, gall-stones, scrofulous conditions and scrofulous sores, chronic rheumatism, chronic gout, rheumatic gout, syphilis, or any diseased condition occasioned by one or more of the last four, and where the water is fully admissible, skin diseases, sciatica, irritation or inflammation of the urinary passages, catarrh of the bladder, urinary calculi (small), white swelling, diseases of the bones, hip-joint disease, and ulcers. The writer might adduce many extraordinary cases which have come under his observation. He could speak of *rheumatic patients*, after years of suffering, completely recovering the lost use of stiff and aching limbs, of their being quite unable at first to grasp the tumbler, of many coming on crutches and going without them—(he remembers one poor man being last seen on his way home, running to catch the train, with his old and trusty supports over his shoulder)—of others, suffering from chronic and rheumatic gout, becoming convinced that here, at length, they had found a remedy on which they really could depend to ease their pains and reduce their swollen joints—of the gloves formerly worn in such cases becoming simply "bags" in a few weeks; of obstinate cases of sciatica cured by a five or six weeks' course of the water—of one such case lately, where, as the the only measure still left, the operation of nerve-stretching was urgently recommended in London, but declined by a north-countryman who, in the most excruciating agony, travelled the 1200 miles for special advice; of melancholic and almost life-long dyspeptics, eating heartily and once again with buoyant spirit enjoying life; of enlargements of the liver, subsiding as if by magic, after causing the gravest apprehensions both to doctor and patient; of the complete cure of otherwise hopeless dropsy of the abdomen, resulting

from hypertrophy of the liver with intense varicosity of the abdominal veins ; of the tottering throne of reason restored to former strength by the vigorous nutrition attendant on a course of the water ; of enlarged spleen reduced from apparently 40 to 20 pounds in forty days ; of chronic and inveterate skin diseases completely and permanently eradicated ; of the old diseased skin being shed in great flakes before the advance of one new and healthy ; of the complete restoration of the hair of the head, after it had been quite lost in such cases ; of scrofulous disease of the bones and joints being cured, when to the surgeon's eye nothing but amputation could save life ; of long-standing and quite intractable ulcers quickly taking on a healing appearance ; of the mechanical expulsion of urinary calculi of such dimensions, that they must, unless either crushed or extracted, have remained in the bladder to increase in size ; but he thinks it must be obvious, from what has been already said regarding the general action of the water, that it cannot but be powerful for good in the above complaints. There are many who can bear witness to the justness of these statements. During the writer's late residence in England, he does not remember ever having recommended its use in his practice there without advantage to the patient, which proves that, though it may be sent a considerable distance, it does not lose much in power. In many morbid conditions of the human body it might, in its action, be compared in domestic economy to a spring cleaning and white-washing. The mere "change" to the Spa could not of itself bring about the results we have pointed out. After nearly twenty years' practical acquaintance with the Strathpeffer springs, and a still more lengthened practical acquaintance with every ordinary single and compound medicine in the whole British pharmacopœia, the writer can, with con-

fidence affirm, on grounds both theoretical and practical, that there is not one of the latter one hundredth part so widely applicable and therapeutically efficient as these waters prepared for us by nature herself in the covert places of her own laboratory. Another physician who had known the Spa for over thirty years, says—"I hesitate not to affirm that the beneficial effects of its waters are applicable to a greater number of diseases than those of any other Spa in Great Britain, perhaps in Europe" It may be reiterated that these waters acting at once powerfully and almost instantaneously on the kidneys, especially the Old Well, and being of less specific gravity than that of almost any mineral waters known, a large quantity of them can be drunk at one time. Thick solutions of crude materials in the blood are thus well thinned as often as the water is drunk, and in the state of high dilution are easily got rid of by nature's eliminants.

It is significant and most interesting to observe how considerate nature is in modifying her prescription so as to meet the conditions of her patients as affected by the seasons of the year. In the colder seasons the kidneys are active, the skin rather inactive, and the liver and bowels sluggish. In the warmer season it is the reverse, the kidneys are less active, the skin more active, the liver and bowels more active. In the colder seasons, nature's prescription is stronger in sulphur gas. This gives more energy to the inactive skin, liver, and bowels, and relieves the active kidneys. In the warmer season, the prescription wisely contains less of the gas, so as to modify over-action of the skin, liver, and bowels, while keeping the kidneys at work. Nor is nature's prescription at Strathpeffer a varying solitary one. She has voluntarily given up several for our past and present use ; many more equally valuable only await our call. As

already noticed, the upper end of the valley is actually permeated with sulphur springs, everyone differing more or less from the others, and therefore differently applicable in the cure of disease. It is for science to interpret and apply them.

In purely cerebro-spinal affections and in great debility the drinking of the water is contra-indicated. In the former great caution with regard to the use of hot baths ought also to be exercised.

So extraordinary indeed are many of the cures effected at the Spa that one is diffident about narrating them, lest he should be accused of unwarrantable praise or of "puff." Even the medical profession might be incredulous, inasmuch as the British practitioner, most skilful in the employment of the preparations of the chemist, is as a rule unfortunately too little acquainted (and in this respect unlike his foreign confrère) with the therapeutics of the compounds of nature in the form of mineral waters, which equally with other of nature's elaborations deserve and claim from us careful scientific examination, and their being turned to practical, useful account—as far as mineral waters are concerned in the alleviation of human suffering. The subject of mineral waters is almost completely overlooked in our medical education; it is not gone in to, and they are, therefore, afterwards but vaguely understood. The public believe in them principally because of the facts connected with their use.

THE CHALYBEATE OR IRON WATER.

For centuries this spring has been well known in the Scottish Highlands as the "Iron Well," sometimes "Saint's Well." It rises at the foot of Ben Wyvis, about three miles from the Spa, and was brought in iron pipes to the Pump-

room a few years ago. Up to last season the water had stood on its way to the Pump-room, first in a large deep open well where it rises, and then at the Spa buildings in an open filter, allowing of the partial precipitation of the iron at each place by atmospheric oxidation, and the escape of carbonic-acid gas, the iron existing in the spring as a carbonate of the protoxide. The filter having now been done away with, and the well emptied down to the effluent pipe at the bottom, the result is, the conservation of the iron, and a very large amount of free carbonic-acid gas in the water, with the delivery at the now permanently open taps in the Pump-room, of an opalescent, highly-effervescent chalybeate, which, when received in the drinking-glass, gradually clears up like champagne. Like the most used, and the most successful iron waters, it contains the essentially small quantity of iron (in its case $\frac{1}{4}$ grain of the carbonate to the ten ounces), and as the supply of the water is abundant (about 900 gallons per day), there would be sufficient for carbonated chalybeate baths, in addition to the present sulphur-bath establishment of the Spa. Besides, therefore, Strathpeffer possessing sulphur waters among the strongest of their class in Europe, as well as recently established facilities for the inhalation of sulphuretted hydrogen vapour, it will now have the advantage of a first-class acidulous chalybeate to enhance its attractions as a Highland health-resort. By mixing the effervescing chalybeate with the sulphur water, an ink-black combination is the result.

In enlargement of the spleen, and in cases of great debility, depending upon, or accompanied with weakness of the digestive mucous surface, or with a tendency to chronic diarrhoea, or with flatulency and hypochondriasis, the writer has found the chalybeate water of much service. Its use is also indicated in cases of debility accompanied with

paleness of the face and poverty of blood, especially in chlorosis, also in direct losses of blood from hæmorrhage, and in losses of the albumen and fibrine of the blood from disease. The iron is present in the water (which is thoroughly aerated) as a carbonate. In union with carbonic acid, and held in solution by that gas, it finds its way readily into the blood either as a carbonate, a lactate, or a chloride, well diluted, and in the essentially very small dose.

Iron, like quinine, acts as a contractor of the spleen. It is therefore useful where the enlarged spleen is affected *per se*, but if the enlargement is depending upon, or accompanied with, sluggish liver, it will be necessary to *carefully* use both the sulphur and the iron water, allowing always some time to elapse between the one and the other. As has been already pointed out, the sulphur water facilitates the circulation through the liver. But the blood of the spleen flows from the spleen through the liver. If the circulation through the latter be facilitated, and the contraction of the former promoted, it is evident that the enlarged spleen would have its diminution favoured. By reference to the analysis, it will be seen that the Strathpeffer iron water contains 2·46 grains of the carbonate of iron in the imperial gallon, which is about $\frac{1}{4}$ of a grain to the 16 ounces. Now, the most used, and the most successful iron-waters are those containing from about $\frac{1}{4}$ to $\frac{3}{4}$ of a grain of the carbonate to the 16 ounces. Separating the iron from its carbonic acid, we find that in each ten-ounce glass of the Strathpeffer water there is 1-10th of a grain of pure iron. If, therefore, five glasses a-day are taken, half-a-grain of the pure metal is received into the blood when all absorbed. In a typical case of chlorosis, or green sickness as it is called, there is a loss from the blood of from 10 to 20—on an average, 15 grains of pure iron. In order to re-establish the healthy

ferruginous state of the blood, it is necessary that this amount should be restored to it *medicinally* as well as by food. By the *water alone*, at the above ratio, 15 grains of the pure metal would be supplied in a month.

The chalybeate water should not be taken when the individual is plethoric ; nor is it good in what may be called nervous bloodlessness.

The iron-water in this new effervescent state is more digestible as well as more palatable than before. In the new state it is better suited for neuralgias or headaches which may have their origin in the stomach. The difference between the new and the old chalybeate is similar to that between a fresh glass of champagne and one that has stood open to the air for some time.

Local ascending douches in the form of injection, of both the sulphur and chalybeate waters, may often, especially in some female complaints, be employed with advantage. They ought, however, to be used with care, and under medical advice.

It is always advisable, before using the waters in any way, to have proper scientific advice. We have known serious consequences frequently to ensue from an ignorant use of them. Mineral waters *anywhere* should always be *cautiously* used. A mineral water, which in the hands of a bath physician who understands it, is a most valuable medicine, becomes, in the hands of the uninitiated, as dangerous as loaded fire-arms in the hands of children.

The bracing air of the place is very serviceable in cases of debility. Some remarkable illustrations could be given of the powerfully invigorating influence of the climate alone. Debilitated nervous systems regain lost energy under the

influence of the climate, combined with the use alternately of both sulphur and chalybeate waters. During a course of the water it is essential that the food used be of easy digestion and most thoroughly well cooked, proper diet being necessary for the health of the invalid.

During the writer's first residence of 6 years at Strathpeffer, as well as during 11 years general practice in England, and since his return again to the Spa, having always taken a deep interest in the sulphur waters and their therapeutic properties, he has had their great superiority over ordinary medicines in the treatment of those affections for which they are used abundantly demonstrated. They are now being strongly recommended by many of the leading London, Edinburgh, and Dublin physicians and surgeons. The writer cannot but believe in them as a "sulphur cure" of the very highest order.

To quote again from Mr. Sherlock's "Hints for the Holidays ;" after alluding to the contemplated visit, some years ago, of H.R.H. the Princess of Wales to Strathpeffer, Mr. Sherlock says :—" From more than one month's trial of Strathpeffer last year, we, who have tasted Buxton and Harrogate, and sundry equally efficacious Spas, as well as Kissingen and other foreign Spas, emphatically attest that Strathpeffer is, therapeutically, the foremost Spa in the three kingdoms, as our own 'poor feet,' and often hard-worked brain, can well and truly testify."

While Strathpeffer as a sulphur Spa has claims equal to those of any foreign Spa, the English-speaking visitor to it has the advantage of hearing and using his own language ; and if he must have a taste of the foreign element, he need be at no loss among the hills and glens around for just enough Gaelic to interest, amuse, and afford him beneficial excitement. Nor can it be said that the social element

is wanting. Thousands of lasting friendships are initiated or strengthened at the place, and all who come to it carry away the most pleasing reminiscences. The first visit is the precursor of many more. Water drinking, "comparing notes," bathing, rambles among the mountains inhaling ozone amid heather and pine, eating with *real* hunger, bowling, lawn tennis, the Pavilion, Promenades, and Reading-room, drives by road and rail to the numerous places of interest around, through the most picturesque of Highland scenery, fishing, lectures, concerts, and dances, fill up the happy time of the health or recreation-seeking visitor.

REPORT ON THE SULPHUR WATERS OF STRATHPEFFER, WITH ANALYSES.

BY

MURRAY THOMSON, M.D.

ANALYTICAL LABORATORY, 8 INFIRMARY STREET,
EDINBURGH, Dec. 20, 1860.

The analyses given below were first undertaken solely to satisfy my own curiosity ; but afterwards, on finding that they were of some value, I made them part of an Essay on the Mineral Waters of Scotland, which is now in progress of publication.

These analyses were made in the autumn of 1857 ; the sulphuretted hydrogen being estimated, as well as some other points determined by myself, while I was in Strath-

peffer, in September of that year. The rest of the analyses were conducted in the laboratory of the Industrial Museum of Scotland (*vide* Official Report by its Director, the late Professor G. Wilson, for 1858). The samples which I used were carefully collected by myself; those of the Pump-room springs were taken during fair weather; that from the Upper Well* the day after a heavy fall of rain. It is said that this upper spring is very easily affected by rain, but I have no evidence of this; on the contrary, I had, in 1859, a second opportunity, during dry weather, of estimating the sulphuretted hydrogen, both in this and the other springs, when I found the latter amounts correspond very closely with those of my former trials. No doubt long continued rains must dilute them.

The Strathpeffer waters deserve a much wider celebrity than they have hitherto enjoyed. They are very valuable in a curative point of view, more especially for chronic diseases of the skin, as well as for chronic rheumatism and gout, for all of which, baths of mineral water are specially indicated. When taken internally, their physiological action is not markedly laxative, but they act fully on the kidneys, and hence their value in many constitutional affections.

The reputation for healing efficacy which these waters have so long had, is well founded on facts, as I have learned after extensive inquiry among the medical men of the district.

MURRAY THOMSON, M.D.,

Lecturer on Chemistry, Edin. Med. School.

I. NEW WELL. "STRONG."

The water from this spring is by far the strongest in sulphureous impregnation. It has an iron-grey colour when

* Now also in the Pump-room.

D. M.

seen in quantity; which I afterwards found proceeded from a small quantity of sulphur suspended as a fine powder. The water had no action on either red or blue litmus paper exposed to its action for more than an hour. When a delicate thermometer was plunged into the cistern, and allowed to remain ten minutes, it showed a temperature of 55° Fahrenheit, the temperature of the atmosphere at the same time being 59° .

I did not determine the amount of free carbonic acid gas in this or the other waters, as I had not the materials for doing so with me.

The amount of sulphuretted hydrogen was twice determined in September, 1857, and once again in September, 1859. On these trials, the quantities given were respectively 4.48, 4.64, and 4.00 grains of this gas in a gallon. The mean of these numbers is 4.34, which, converted into cubic inches, gives 11.26 as the volume of sulphuretted hydrogen in an imperial gallon. The qualitative analysis showed the presence of—*Base* : lime, magnesia, potass, soda, trace of iron. *Acids* : sulphuric, carbonic, phosphoric, hydrosulphuric, silicic, and sulphur. Besides these, there was present a very small amount of organic matter.

A gallon of the water precipitated 15.54 grains of solid matter on boiling, which consisted of:—

Phosphate of lime and magnesia	0.50
Carbonate of lime	14.88
Carbonate of magnesia	traces
	<hr/>
	15.38

Statement of the combined results of analysis:—

Sulphuretted hydrogen gas, in grains	4.34
The same in cubic inches	11.26

Sulphate of lime . . . in grains . . .	50.92
Carbonate of lime	14.88
Phosphate of lime and magnesia	0.50
Sulphate of magnesia	31.08
Carbonate of magnesia	traces
Sulphate of soda	5.86
Sulphuret of sodium	0.53
Sulphuret of potassium	1.30
Organic matters	1.02
Silica	2.14
Sulphur in suspension	4.07
Chlorine	traces

 112.30

These quantities are those contained in an imperial gallon. The amount of total solids which a gallon contains, as ascertained by experiment, was 111.93 grains.

The specific gravity of the water at 60° is 1002.46.

I may also add that this water can retain for a long time a good deal of its sulphuretted hydrogen gas. A sealed bottle, opened twenty days after my visit to Strathpeffer, contained this gas in quantity at the rate of 2.08 grains in a gallon, or nearly one-half of what it had at the well.

II. OLD WELL. "WEAK."

This is a much clearer water than its neighbour. On standing, however, it deposits a very minute amount of sulphur. It has no action on either red or blue test-paper. Qualitative analysis showed the presence of—*Bases*: lime, magnesia, soda. *Acids*: sulphuric, carbonic, phosphoric, hydro-sulphuric, and sulphur.

The determinations of sulphuretted hydrogen of 1857 and 1859, gave precisely the same result, namely, 1.60 grains in a gallon, equivalent to, in cubic inches, 4.01.

Statement of the combined results of analysis :—

Sulphuretted hydrogen, in grains . . .	1'60
The same, in cubic inches . . .	4'01
Sulphate of lime . . . in grains . . .	18'89
* { Carbonate of lime	7'43
{ Phosphate of lime and magnesia . . .	0'43
{ Carbonate of magnesia	1'09
Sulphate of soda	2'47
Sulphuret of sodium	0'78
Chloride of sodium	4'60
Potass salts	traces
Organic matter	2'66
Silica	0'77
Sulphur in suspension	2'47
	<hr/>
	41'59

The amount of solid matter contained in a gallon, as ascertained by experiment, was 42'16 grains. The specific gravity at 60° is 1000'93. The temperature at the spring on the day of visit 52°. This water, kept in bottles for twenty-one days, contained 0'35 grain of sulphuretted hydrogen in a gallon.

III. THE UPPER WELL.

In appearance, this water resembles that from the Strong Well in the Pump-room. The sediment is not so large, but it is peculiar in containing minute black particles, which I afterwards found consisted of sulphide of iron.

When allowed to act on blue litmus paper, it slightly reddens it†. The qualitative analysis showed the presence

* The substances contained within the bracket represent the precipitate produced by boiling, which amounted to 8'95 grains in a gallon.

† All the sulphur waters are alkaline when the sulphur gas escapes.

D. M.

of—*Bases* : lime, magnesia, potass, and soda. *Acids* : sulphuric, carbonic, hydro-sulphuric, silica, chlorine, and sulphur; also a little organic matter. The sulphuretted hydrogen gas was twice estimated in 1857, and once in 1859, the numbers obtained being, 1st 1'04; 2nd, 1'05; 3rd, 1'56 grains in a gallon. The mean of these is 1'21, or in cubic inches, 3'03.

The precipitate produced by boiling amounted to 8'24 grains, and consisted of—

Carbonate of lime	6'24
Carbonate of magnesia	1'78
	<hr/>
	8'02

Statement of the combined result of analysis :—

Sulphuretted hydrogen gas, in grains	1'21
The same in cubic inches	3'03
Sulphate of lime in grains	23'43
Carbonate of lime	6'24
Sulphate of magnesia	39'18
Carbonate of magnesia	1'78
Sulphate of soda	9'87
Sulphuret of sodium	0'12
Chloride of sodium	4'54
Sulphuret of potassium	0'89
Silica	3'06
Organic matter	2'35
Sulphur in suspension	1'84
Sulphide of iron	1'08

94'38

Total amount of solid matter in a gallon, 94'16 grains.
Specific gravity of the water at 60°, 1001'40. Its temperature at the well 55° on the day of visit.

SYNOPSIS OF ANALYSES OF THE STRATHPEFFER SULPHUR WATERS.

In imperial gallon :—*

	STRONG. Grains.	OLD. Grains.	UPPER. Grains.
I. SOLIDS.			
Sulphate of lime	50·92	18·89	23·43
Carbonate of lime	14·88	7·43	6·24
Phosphate of lime and magnesia	0·50	0·43	—
Sulphate of magnesia . . .	31·08	—	39·18
Carbonate of magnesia . . .	traces	1·09	1·78
Sulphate of soda	5·86	2·47	9·87
Sulphuret of sodium	0·53	0·78	0·12
Sulphuret of potassium . . .	1·30	—	0·89
Silica	2·14	0·77	3·06
Organic matters	1·02	2·66	2·35
Sulphur in suspension . . .	4·07	2·47	1·84
Chlorine	traces	—	—
Chloride of sodium	—	4·60	4·54
Potass salts	—	traces	—
Sulphide of iron	—	—	1·08
	<hr/> 112·30	<hr/> 41·59	<hr/> 94·38
II. GASES.			
Sulphuretted hydrogen . . .	4·34	1·60	1·21
The same in cubic inches . .	11·26	4·01	3·03
Carbonic acid—undetermined.			

* Equal to 160 ounces.

ANALYSIS OF CHALYBEATE WATER
OF STRATHPEFFER,
WITH REPORT ON IT,
BY
DR. STEVENSON MACADAM.

ANALYTICAL LABORATORY, SURGEONS' HALL,
EDINBURGH, *July 6th 1871.*

Analysis of sample of water from Saint's Well, Strathpeffer.

One imperial gallon contains :—

	Grains.
Carbonate of iron	2'46*
Carbonate of lime	3'14
Chloride of sodium	1'17
Sulphate of lime	1'13
Chloride of magnesium	0'38
Carbonate of magnesia	0'41
Phosphates	0'19
Soluble silica	0'21
Organic matter	0'47
Total matter dissolved in imperial gallon	9'56

Hardness $7\frac{1}{2}^{\circ}$

	Cubic Inches.
Total gases dissolved in imperial gallon	12'68

* About $\frac{1}{4}$ grain in 20 ounces.

Percentage composition of the gases—						Cubic Inches.
Carbonic acid	.	.	.	.	.	31·98
Oxygen	.	.	.	.	.	20·34
Nitrogen	.	.	.	.	.	47·68
						<hr/> 100·00

The above water is of pure and wholesome quality, and partakes of the characters of a mild chalybeate spring. It is thoroughly aerated, containing $12\frac{2}{3}$ cubic inches of gases, dissolved in the imperial gallon, of which carbonic acid constitutes nearly one-third of the whole. I am of opinion that this water will be found beneficial as a beverage, in all cases where a mild chalybeate spring is recommended.

STEVENSON MACADAM, Ph.D.

F.R.S.E., F.C.S.

Lecturer in Chemistry.

ANALYSES BY DR. HOFFMANN

OF THE

STRONGEST SULPHUR-WATERS OF HARROGATE.

They contain in sixteen ounces :—*

I. SOLIDS.				Old Sulphur Well. Grains.	Montpellier Strong. Grains.
Sulphuret of sodium	.	.	.	1·548	1·441
Sulphate of lime	.	.	.	0·013	0·059
Carbonate of lime	.	.	.	1·237	2·418
Fluoride of calcium	.	.	.	trace	trace
Chloride of calcium.	.	.	.	8·174	6·191

* Tenth part of an imperial gallon.

I. SOLIDS.	Old	Montpellier
	Sulphur Well.	Strong.
	Grains.	Grains.
Chloride of magnesium	5'569	5'467
Chloride of potassium	6'470	0'575
Chloride of sodium	86'018	80'309
Bromide of sodium	trace	0'
Iodide of sodium	trace	0'
Ammonia	trace	trace
Carbonate of protoxide of iron	trace	0'
Carbonate of protoxide of manganese	trace	0'
Silica	0'025	0'184
Organic matter.	0'	trace
	<hr/>	<hr/>
	109'658	96'646
II. GASES.	C. Inch.	C. Inch.
Carbonic acid	2'200	1'401
Carburetted hydrogen	0'584	0'053
Sulphuretted hydrogen	0'531	0'
Oxygen	0'	0'048
Nitrogen	0'291	0'482
	<hr/>	<hr/>
	3'409	1'984

ANALYSIS BY DR. MACADAM

OF THE

MOFFAT SULPHUR WATER.

It contains in the imperial gallon :—

	Cubic Inch.
Free sulphuretted hydrogen gas	'353
	Cubic Inches.
Free and combined sulphur, equal in sulphur- etted hydrogen gas to	2'168
	Grains.
Sulphuret of sodium	1'51
Chloride of sodium	60'72
Chloride of magnesium	7'25
Chloride of calcium	10'02
Silicate of soda	3'46
Carbonate of lime	1'31
Carbonate of magnesia	'87
Organic matter	2'27
Deficiency in analysis of soluble salts, referable principally to moisture from the hygrometric character of the residue obtained on evaporation of the water	1'37
Loss during analysis of the earthy carbonates	'08—1'45
Free silicic acid	traces
Total solid residue	88'86

ANALYSES BY BARON LIEBIG

OF THE

AIX-LA-CHAPELLE WATERS.

In sixteen ounces :—*

I. SOLIDS.				Kaiser- quelle. 131°. Grains.	Cornelius- quelle. 113°6'. Grains.
Chloride of sodium	.	.	.	20'271	18'934
Bromide of sodium	.	.	.	0'028	0'028
Iodide of sodium	.	.	.	0'004	0'004
Sulphuret of sodium	.	.	.	0'078	0'042
Carbonate of soda	.	.	.	4'995	3'817
Sulphate of soda	.	.	.	2'171	2'201
Sulphate of potash	.	.	.	1'186	1'204
Carbonate of lime	.	.	.	1'217	1'012
Carbonate of magnesia	.	.	.	0'395	0'192
Carbonate of strontia	.	.	.	0'002	0'002
Carbonate of lithia	.	.	.	0'002	0'002
Carbonate of protoxide of iron	.	.	.	0'073	0'046
Silica	.	.	.	0'508	0'459
Organic matter	.	.	.	0'577	0'713
				31'502	28'654

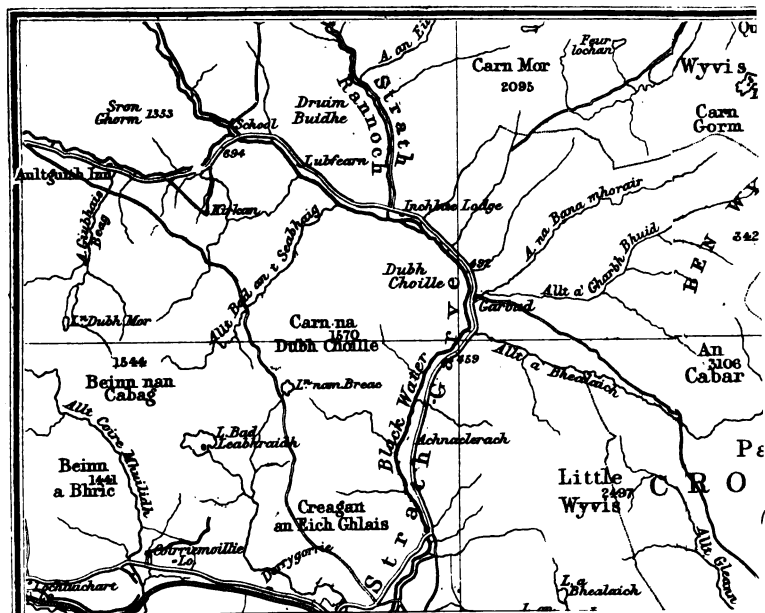
II. GASES which are contained in the same springs.

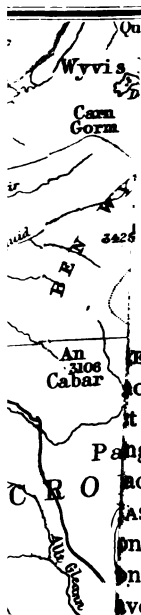
	Per cent.	Per cent.
Nitrogen	9'	7'79
Carbonic acid	89'40	92'91
Carburetted hydrogen	0'37	traces
Oxygen	1.23	traces

* Tenth part of an imperial gallon.

The gases which ascend from the water consist of :—

	Per cent.	Per cent.
Nitrogen	66·98	81·68
Carbonic acid	30·89	17·60
Carburetted hydrogen	1·82	0·72
Sulphuretted hydrogen	0·31	0·00





PART II.

WALKS AND DRIVES, &c.

There are various places of interest and resort in the neighbourhood of the Spa, which, throughout the season, attract daily excursion parties. Some of these are within a short distance, while to the more remote, delightful drives and rail through the varied scenery may be had.

CASTLE LEOD.—In the immediate vicinity of the Spa, on the way to it from Dingwall, is Castle Leod, clad in one of the seats of the family of Cromartie. It is said to have been built by Sir Roderick Mackenzie, tutor of Dingwall, in the beginning of the seventeenth century. Over the uppermost windows at the back of the castle, "M. C. 1616" may be deciphered, and over another "M. K. 3 Agus." Placed near the base of a rounded ward-hill (Knockaulah, now prettily planted), and surrounded with avenues and clumps of tall "ancestral trees," the castle presents as truly venerable and baronial an appearance as any residence in the Highlands. The park contains many fine old trees, and among others a Spanish Chestnut, said to be the finest of its kind in Britain. It measures twenty-six feet in circumference at the base, and sixteen feet breast-high. In the Messrs. Anderson's "Guide to the Highlands," this tree, by some mistake, is represented as having been lately thrown down by the wind. It has certainly been severely handled, but it still stands, as ever, its sturdy old trunk bidding defiance to the

hurricane. Visitors at the Spa have the privilege of walking in the park in the morning before nine o'clock. Between the park and the Spa, on the north side of the road, near Eaglestone Villa, stands a stone in a mound of earth, having an eagle (the crest of the Munroes) with a horse-shoe-like delineation above, cut upon it, and called in Gaelic, *Clach-an-tionndadh*, or the Turning Stone. It is supposed to mark the place where a number of the Munroes of Fowlis fell in an affray with the Mackenzies of Seaforth. The tradition is as follows:—Seaforth's Lady, in those days, dwelt in a wicker or wattled house at Kinellan, a mile west from the Wells. A party of the Munroes came upon her by surprise, and carried off the lady, house, and all that it contained. They were overtaken at this point, defeated with great slaughter, and the Lady of Seaforth rescued. *Clach-an-tionndadh* was set up by the Munroes over the remains of their fellow-clansmen. Kenneth Ore, a Ross-shire seer of the seventeenth century,* prophesied that in course of time ships would be seen moored to this stone. The late Rev. Dr. Longmuir, of Aberdeen, who bestowed attention on the Standing Stones of Scotland, was of opinion that this one refers back to a much earlier period in the history of the country than the times of the clan feuds. The delineation surmounting the eagle he considered symbolic of heaven, the eagle denoting power. Of two standing stones, concealed from the road by the trees, at each end of the church of Fodderty, there is no reliable tradition; the stone at the west end has some ancient cup-markings on it (see Antiquities).

THE RAVEN'S ROCK.—A favourite walk with visitors is

* Regarding this individual, and some of his other "predictions," see Hugh Miller's "Scenes and Legends of the North of Scotland," p. 163. A few of his "prophecies" have come to pass, but proof is wanting that he ever conceived them.

the one to the Raven's or Echoing Rock (*Creagan-fiothach*, Rock of the Raven), about a mile-and-a-half westward from the little village of Auchterneed, along the railway line. The rock presents a bold perpendicular front of imposing height, and throws back over an intervening chasm, through which the railway runs, a remarkably distinct echo, best heard by climbing the brow of the hill above the line. To the left of the railway, as it nears the rock, is the chalybeate spring, called Saint's Well, from which the chalybeate water of the Spa is obtained, being conveyed to the Pump-room in iron pipes coated with Smith's patent composition. Another apparently equally strong chalybeate was discovered, during the cutting of the railway, half-a-mile nearer the village just mentioned.

KNOCKFARREL VITRIFIED FORT AND THE CAT'S BACK HILL.—Two miles east of the Spa, and on the south side of the valley, is the Hill of Knockfarrel, crowned with one of those vitrified forts peculiar to the Highlands, and which are still a puzzle to the antiquary. The hill presents a very striking appearance, resembling somewhat a flattened cone. It is well-nigh perpendicular on its north and south sides. The fort is one of the most celebrated and best marked of the kind in Scotland. It is of an oval form, and provided with out-works at each end, which run along the shoulders of the hill-top, as if intended to interrupt attacks from enemies, where by nature these would have been most easy. The cementing material used in the consolidation of the fort may have been formed by some such process as kelp, perhaps by the mixing of wood with seaweed*. It resembles not a little

* The above hypothesis which was hazarded in the first edition of this work in 1869 the writer has *since found* to be borne out by discoveries made by Mr. Patrick Duff, of Elgin, and Hugh Miller, the former of whom found on breaking open a vitrified fragment from an ancient hill-fort, distinct impressions of the kelp-weed of our shores; and the latter, fragments of pure charcoal hermetically sealed up and

the slag of an iron furnace, which consists of a fused mass of clay and lime. From appearances underneath the blocks of vitrification, it is evident that the fused matter must have been allowed to penetrate from above the rampart of loose stones, many of which present the appearance of having been subjected to intense heat. The hills on which vitrified sites occur are usually, though not always, very conspicuous, and, with few exceptions, command an extensive view, while the summits are generally tabular or conical, and detached from other heights. They are steep and rocky, and towards the top, or at least along the most accessible approach, are wholly or partially encircled with one, two, and in some instances, with three ramparts or walls of loose stones, three or four feet in height. The theory most reconcilable with the appearances is, that these sites were places at once of defence and for beacon-fires. From the top of the hill an extensive view is obtained, embracing, on the east, the Cromarty Firth (the seaman's safe retreat in

distinct impressions where it had disappeared, in the Knockfarrel cement. On a southern spur of the hill of Scur-Marxy, nine miles west of Knockfarrel, there are three small vitrified strongholds, with fused and semifused material exactly similar to that of Knockfarrel. On a recent visit there the writer found specimens of pure charcoal ejected in the earth-hillocks of the modern fort-holders—the moles. In the case of inland forts where seaweed could not be had, heather or wild grass may have been used instead, packed up with the wood. The iron of Sussex, and the lead of Derbyshire were originally smelted by wood fires on hills (bole-hills), in the open air. The ancient Britons must have been acquainted with fluxes and the kind of stones which most readily yield to the influence of heat—the chief in the Knockfarrel fort being gneiss, quartz, and mica-schist. Kelp glass was extensively used in recent times in this country for glass-houses.

The summit of Knockfarrel is very markedly green, more so than any other hill in the district. How has this come about? Dr. Fleming, in his "Zoology of the Bass" says:—"The summits and sides of those hills, which were occupied by our ancestors as hill-forts, usually exhibit a far richer herbage than corresponding heights in the neighbourhood, with the mineral soil derived from the same source. These positions were at the same time occupied as *hill-folds*, into which, during threatened or actual invasion of the district, the cattle were driven, specially during the night, as to places of safety, and sent out to pasture in the neighbourhood during the day; and the droppings of these collected herds would speedily improve the soil to such an extent as to induce a *permanent* fertility." "On the bleak moor of Culloden," (see Culloden) says Hugh Miller, "the graves of the slain still exist as patches of green sward. The animal matter must have been wholly dissipated ages ago. But the effect once produced has so decidedly maintained itself, that it remains not less distinctly stamped upon the heath in the present day, than it could have been in the middle of last century, only a few years after the battle had been stricken."

storm—the *portus salutis* of the Romans) and Sutors of Cromarty,* on the south, Loch Ousie, studded with a number of wooded islets, and in which lies Kenneth Ore's magic stone,† by which he foretold the future; on the west, the western hills of Ross, among which the conical peaks of Scuirvullin present a very striking appearance; on the north, the broad and massive Wyvis‡ king of the Ross-shire mountains, with the valley of Strathpeffer intervening. Towards the west end of the valley is Castle Leod, already noticed; at the eastern extremity the woods of Tulloch (Col. Davidson,) rise to view.

Continuous with the western shoulder of Knockfarrel, and forming the southern boundary of the valley of Strathpeffer, is a wooded ridge of hill, called The Cat's Back *Drhuim-Chat*, and sometimes The Hill of Park *Knoc-an-Parc*, from the heath-brown summit of the western extremity of which a magnificent view of the western hills is obtained. An airy walk, with fine views of Castle Leod on the one side, and Loch Ousie on the other, may be had along the top of the ridge from Knockfarrel to this point. Between it and the conical peaks just referred to, is Loch Achilty; to the right, and about a mile and a-half from the spectator, is Loch Kinellan; beyond it, a peep of Loch Garve is obtained; to the left, the two rivers, the Blackwater, and beyond it, the Conon, are seen winding to their confluence. Looking south, the Beaully Firth comes into view; behind, on the Cromarty Firth, Invergordon can be seen. The whole scene is one of great splendour, and is best enjoyed when the

* Sutors, anglicè shoemakers. Two squat rocky headlands guarding the entrance to the Cromarty Firth.

† See Hugh Miller's "Scenes and Legends of the North of Scotland," page 165; also "Braham Seer."

‡ "Ben Wyvis" says Hugh Miller, "has breadth of base and shoulder quite enough to serve a mountain thrice as tall. If he had been of granite or porphyry he would have been taller though not so broad, he is gneissy and therefore flat."

shadows of the crowded hills are brought out by an afternoon sun. Easy access can be had to each of the above view-points, either by roads and footpaths through the intervening fields, passing at the outset the Ben Wyvis Hotel stables, or by way of Elswick Cottage (H. M. Matheson, Esq.), and along the northern margin of what is called the Blackmoor wood.

THE VIEW ROCK.—Another excellent view-point is the "View Rock," about two miles westward from the Spa. Passing along the hill-side of Kinettas farm and above the Spa Hotel, or passing from the main road Kinellan farmhouse, and skirting Loch Kinellan on its southern margin, a row of thatched dwelling-houses is seen on the opposite hill-side, beyond which, a footpath turning to the left conducts to the point in question. Once reached, a charming view from it is obtained. Here again the western hills form the most prominent feature of the landscape. In the foreground is Loch Achilty, embosomed in birch-clad hills which slope to the water's edge; near it, and to the right, is Craigdarroch shooting-lodge, at the base of a wooded crag of that name. In the immediate foreground are Achilty Inn, with its farm, and the Blackwater celebrated as a salmon stream. On an island to the left, encircled by the waters of this river, stand Contin Manse and Church. Some two miles beyond the island is Fairburn House (John Stirling, Esq.), to the left of which the old tower of Fairburn may be seen. On the left of the spectator, are the finely-wooded grounds and mansion-house of Coul (Sir Arthur G. Ramsay Mackenzie, Bart.); on the right, Ben-Wyvis, and to the west of it, Little Wyvis. The beautifully-wooded hill of Tor-Achilty rises immediately behind the plain of the Blackwater.

About two miles to the north-west of the View Rock, are the Falls of Rogie (see Drives), on the Blackwater, which

are quite within walking-distance by this way from the Spa, though, through the moor, they are not always easily found. In Loch Kinellan, passed on the way to the View Rock, stands an artificial island,* resting on logs of oak, on which the family of Seaforth had at one period a house of strength; and a quarter of a mile eastward (where the Spa Hotel now stands) is the place of *Blar-nan-Ceann*, or Field of Heads, so named from having been the scene of a very sanguinary conflict, about the year 1478, between the Mackenzies of Seaforth and the Macdonells of Glengarry. The latter, according to tradition, came, as was the fashion in those days, to resent an old feud by force of arms, but were routed after great slaughter, and being pursued by the Mackenzies to the confluence of the rivers Blackwater and Conon at Moy, were there either killed or forced into the water and drowned. One thousand of the Islesmen lost their lives. This victory utterly crushed the Macdonells, and completely established the power of the Mackenzies. Kenneth, the conquering hero of the battle, was knighted by James IV.

TOR-ACHILTY.—A pleasant walk may be had to Contin and Achilty, by a pathway through Coul wood. The wood is reached by a footpath through the fields on the south-west side of Loch Kinellan. A very extensive and exceedingly fine view may be had from the top of Tor-Achilty, noticed in last walk. The hill is best reached by a road through Achilty farm, leaving the main road a little to the east of Achilty Inn. The view from the top of the hill embraces, for the most part, scenery already noticed. An exceedingly picturesque view is obtained of the valley of the Conon, with Scatwell shooting-lodge to the west on its right bank.

* Now kept as a garden.

The hill is an excellent botanical habitat, and a good one for the entomologist.

Nearer the Spa, however, many beautiful views of the valley of Strathpeffer, Ben-Wyvis, the Western Hills, and the Cromarty Firth, may be had, from Kinettas Hill, just above the Spa, and from the hill above Castle Leod, the former of which, owing to its close proximity to the Wells, is much resorted to.

BEN-WYVIS.—But of the many views to be had from eminences around Strathpeffer, that from the top of Ben-Wyvis ("the Mountain of Storms," though it is by no means so "stormy" as its name would imply), is of course the grandest and most extensive. The mountain is the property of her Grace, the Duchess of Sutherland, Countess of Cromartie, and is said to be retained on condition of the holder being able to present to the Crown, from its corries, a snowball on any day of the year. It rises to a height of 3422 feet above the level of the sea, and is of comparatively easy ascent, though an excursion to its summit is somewhat fatiguing, owing to the broken and mossy nature of the ground at its base. The best way to it is, by the village of Auchterneed as on the way to the Raven's Rock, keeping upwards above the village by a rugged cart-track, and crossing the western shoulder of the hill behind the village by a road leading to peat-moss at the base of the mountain; crossing then the Skiach burn, and ascending along the course of a mountain torrent coming down. During the ascent the white mountain hare (a kind of half hare half rabbit), will be frequently started; occasionally a red deer may be seen. On the heights ptarmigan abound. The summit affords a magnificent and bracing promenade, being an elongated winding flat or plateau of some two miles,

carpeted with a firm elastic turf, quite refreshing to walk upon after the fatigue of climbing. The view from the top, on a clear day, embraces all between the mountains of Caithness and Sutherland in the far north, and the Grampians in the distant south—some eight counties, with the island of Lewis, if the atmosphere is very clear—a sight most gladdening and restorative. While many a silvery streak of winding stream delights the eye, full half-a-score of Scotia's fairest lakes lie glittering to the gaze. Vast home of antlered monarchs proud the western hills of Ross, standing up as one huge army, range beyond range for fifty miles and more, reach onwards to the sea, fringing with their dark blue heights in craggy line the occidental sky ; while to the east the quiet waters of the Moray Firth winding and widening outwards away into ocean blue, touch with their rippling crests the eastern sky. The distance from the Spa to the top of the hill is about ten miles. Ponies may be taken all the way to the top. The ascent can be accomplished between breakfast and dinner. If required, a guide may be obtained in the person of "Geordie" Munro of Park, who knows well every turn, and is not without something to say. Another guide is Simon M'Kay, of the village of Auchterneed, who was recently employed *to cart* wire-fencing, &c. to the top. The barometer should be consulted before setting out for the hill, and a good field-glass would be useful. In settled weather a night ascent of the mountain to witness the glories of sunrise over the vast and gorgeous panorama of mountain, flood, and river, is an episode in one's life never to be forgotten. A mile from the summit, and within a hundred yards of the way of ascent, is a huge spring of the purest and coolest of cold water, issuing from the side of the mountain, and yielding some 4000 or 5000 gallons an hour.*

* At this rate it would supply a population of 4000 with from 24 to 30 gallons a day each. The average supply in *English towns* is 28 gallons per head.

The guide would point it out. A hotel on the summit of this "Mountain of Storms" would certainly be a "castle in the air," but meanwhile it would have the material advantages of adamantine foundations, and a "grand parade" in the truest sense of the term, commanding a panoramic view, for grandeur and beauty, among the finest in the world. The eye would be feasted, delicate chests would be healthfully expanded, and there would be an enjoyable certainty of unusual security from germs, miasmatic emanations, and sewer gas. This "castle" would almost rival Mürren and the Rigi-Kaltbad—well-known Alpine health resorts.

The various lochs in the neighbourhood of Strathpeffer offer great facilities for "boating," but they have not yet been taken advantage of for this purpose for Spa visitors. Fishing may be obtained, but salmon fishings are in general let for the season. Parties staying at Strathpeffer frequently take a run by train (between breakfast and dinner) to fish on Loch Achanalt, and sometimes permission can be obtained to fish on Loch Luichart and the streams flowing into it; also on Loch Garve. By telegraphing in the morning to Achnasheen, to Mr. M'Iver of Achnasheen and Achanalt Inns, a boat would be in readiness for the angler on Loch Achanalt, which is open to visitors at the Inn. Achanalt Station is the third from Strathpeffer on the Dingwall and Skye Railway. The trout on the loch run to 4 and 6 lb., and are seldom below $\frac{3}{4}$ lb. They take best with a westerly breeze and are excellent sport. The best time is from May to August. Ordinary flies do well, but the angler should see that his tackle is good, and be provided with a landing net. Quite enjoyable trout fishing may also be had, without restriction, on the Peffery water as it winds its way from the bridge on the turnpike road at the corner of Castle Leod

Park down the valley of Strathpeffer; or higher up the stream near the Raven's Rock, taking as a route to it the railway line. Good sport may also be had on another stream just beyond the Raven's Rock, and better still in the Bialloch Burn, two or three miles across the moor from the last stream, also on the Skiach Burn, mentioned in the way to Ben-Wyvis.

Towards the end of the season a little "nutting" may be enjoyed in some hazel copses near the Spa. These lie northwards from the Spa, through the fields.

DRIVES.

If, however, there is abundant scope for *walking* in the immediate vicinity of the Wells, there are also many attractive *drives* in the country around.

FALLS OF ROGIE.—Of drives, that to the Falls of Rogie is a very favourite one. The Falls are five miles west of the Spa, on the Dingwall and Skye road, and may be seen from the road, at a point little more than a mile beyond Achilty Inn. They are on the estate of Coul (Sir Arthur G. Ramsay Mackenzie, Bart.). A more picturesque piece of scenery than they, with their birch-clad surroundings, constitute, is seldom to be seen. From an airy foot-bridge suspended just below the Falls an excellent view of them is obtained. If the sun shines, and its position is favourable, a small rainbow may be seen in the floating spray, and in the season, the salmon may with interest be watched at their saltatory efforts "taking," or attempting to "take," the Falls. The drive to the Falls may be pleasantly prolonged four miles further, through wild mountain scenery, by Lock Garve, to Garve

Inn, a comfortable house, with a number of stags' heads and Highland ornaments to be seen in it. As the railway here is very close to, and parallel with the road, the times of the passing of trains had better be studied with timid horses. Strathgarve Lodge, the Highland residence of Charles A. Hanbury, Esq., is seen a mile to the right, at the upper end of Loch Garve. Five miles beyond Garve Inn, by the Ach-nasheen road, and beautifully situated amid birken copse at the western extremity of Loch Luichart, is Kinlochluichart shooting-lodge, the property of Lady Ashburton. Garve is the first, and Loch Luichart the second station on the Dingwall and Skye line after leaving Strathpeffer.

The genuine "peat-reek" perfume begins to be discernible in the air about Garve. Further west, by land and sea, this perfume is to be met with in a concentrated form as an "essence" from the rafters or thatch of damp peat-smoked huts. Abroad, we have met ladies, natives of those regions, who carried with them the delicate perfume in their scent bottles, as a cherished souvenir of their native glens. "The Real Peat-Reek" is a name at times humourously applied to real (original) Scotch whisky—owing to the smoky flavour it acquires from *peat* used in drying the malt. We believe that such distilleries as those of Islay, Campbeltown, Skye, Glenlivet, Long John, and others, owe their celebrity to this *peat flavour*, which recommends the spirit not only to Scotch, but nowadays to many English palates. Southern distillers might find the "essence" of some value in *their* manufactures.

FALLS OF THE CONON.—Another favourite drive is that to the Falls of the Conon, which are nine miles from the Spa. They and the Rogie Falls are sometimes both "done" at at once, the latter being only a mile off the road, in going to or returning from the former. The road to the Conon,

striking to the left, leaves the Dingwall and Skye road a little beyond Achilty Inn. Passing Craigdarroch shooting-lodge and grounds on the right, and skirting the exquisitely-beautiful Loch Achilty, it proceeds through most picturesque scenery, over birch-clad knolls to the valley of the Conon. About half-a-mile beyond the western extremity of Loch Achilty, and a short way off the road, is the small Loch Giglio, the margins of which in the season, are richly bedecked with water lilies. On nearing the Conon, Scatwell Lodge (Alexander Mackenzie, Esq.), comes into view. A mile to the left, and to the west of it, the river Meig, from Strathconon, will be seen joining the Conon. Shortly afterwards the carriage road comes to a stop, and the rest of the distance to the Falls (about a mile) must be walked. A rugged footpath, running parallel with the stream, through birch and bracken, conducts to the Falls ; but they may be approached to greater advantage by a bridle path, on the other side of the stream, after crossing the ferry. What are called "The Falls" (Lower and Upper) are the two principal of a series of cascades, occurring in the first mile of the course of the Conon, after issuing from Loch Luichart, its parent lake. The Loch is about a quarter-of-a-mile above the Falls. The Lower Fall partakes more of the nature of a running cataract, while at the Upper, the water falls more precipitously, and from a greater height. Owing to the greater volume of water in the Conon than in the Blackwater, the Upper Fall, if seen near, is more imposing than are the Rogie Falls, while the scenery around is wilder. The Conon here separates the estate of Coul from the Loch Luichart property of Lady Ashburton. The lofty crag beyond the Falls is called Scur-Marxy. On a southern spur of this crag are three small vitrified forts, named the Black Cairn, *Chairn-Duibh*, similar in structure to that of Knock-

farrel. Returning from the Falls, the awful gorge (a mile to the south-west of the ferry), through which the Meig pours its roaring waters from Strathconon, might be examined. The rocky sides of this gorge rise to a height of from 200 to 300 feet. It is nearly a mile in length. The visitor is here on the property of Little Scatwell, recently purchased by H. M. Matheson, Esq., of Elsick Cottage. Just below the junction of the Meig and Conon the stream may, if the water is low, be forded by carriages, and (time permitting), the drive pleasantly prolonged round the hill of Tor-Achilty eastward, through charming scenery overhanging the Conon—returning home by re-crossing the Conon by Moy Bridge. The road on the other side of the water is that through Strathconon. It runs westward through the strath about fourteen miles, and passes Scurvullin Hill on the right, some eight miles above Scatwell. The mountain scenery of this valley is very fine, and affords one of the most exquisitely charming drives of the district. The river Conon is celebrated for the number and quality of its pearls.

FALLS OF THE ORRIN.—The Falls of the Orrin are about six miles south-west of the Spa, with good carriage road (nine miles) all the way. Leaving the Dingwall and Skye road at Contin village, and crossing the Conon a mile and a half eastward at Moy Bridge, the road runs almost straight over a cultivated and wooded tract of the property of John Stirling, Esq., of Fairburn, to the Orrin water. On approaching the stream, the beautiful new lodge just erected at the entrance to the grounds of Fairburn, attracts attention. The Falls will be found on the left of the carriage-drive, a quarter-of-a-mile from the lodge. Mr. Stirling allows strangers to visit the Orrin Falls daily by the carriage drive. A board near the Falls states that the road is private, but by his kind permission, it is open on Tuesdays and Thursdays past

Fairburn House. The old Tower of Fairburn may be visited daily by road, but not through the woods. The district around, through which the river flows, is richly wooded and romantic in the extreme. At the Falls, the water rushes over a mass of conglomerate rock. Becoming confined in a narrow sloping channel, it hurries furiously onwards to a precipice of some height, over which it pours into a deep elongated chasm, and reaches the level of the stream below. Here, too, the salmon may, in the season, be watched "taking" the fall. Half-a-mile north of the Falls is Fairburn Tower, tall and lone and roofless, anciently a stronghold of the freebooter, now a "ghastly spectre of the past, looking from out its solitude on the changes of the present." Northwards from the Tower, about three-quarters of a mile, are one or two sulphur springs, the same in kind as those of Strathpeffer, and north-west from them are two others, the one on the side of the bed of the Conon, the other below Fairburn Mains. The strongest of these, according to our analyses, contained scarcely an eighth of the sulphuretted hydrogen found in the Strathpeffer Strong Well. In returning from the Falls of the Orrin, a fine view is obtained of the grounds of Brahan Castle, the seat of Major Stewart-Mackenzie, of Seaforth.

BRAHAN CASTLE AND DINGWALL. — A very pleasant drive of thirteen or fourteen miles may be had by the woods of Brahan, and the village of Maryburgh, to Dingwall*—returning home by the valley of Strathpeffer. On approaching the grounds of Brahan, the bold perpendicular cliffs called "The Brahan Rocks," wooded on the top, and towering high over the woods below, present a very imposing spectacle, the road meanwhile leading through enormous

* The native town of the mother of Mr. Gladstone

fragments of rock, mossy and tufted with fern, which in their time must have fallen with thundering crash from the precipices above. They form a kind of dilapidated natural rockery, any one of the stones of which would grind to powder the modern erections of our lawns. Here the road divides into two—the one to Maryburgh and Dingwall striking to the left, the other holding on through the grounds of Brahan. At the point of division, is a monument erected over the spot where a sister of the late Hon. Mrs. Stewart-Mackenzie sustained injuries in a carriage accident, the immediate consequences of which were fatal. Respectable visiting parties are always made welcome to see the grounds and gardens of Brahan. The policies are extensive and splendidly wooded, the gardens exceedingly fine, the flower garden being laid out with exquisite taste. The Castle is a massive modernised building, originally castellated. It contains many choice works of art; among others, a large family-piece by West, which is said to have cost £3000.

FALLS OF KILMORACK.—The Falls of Kilmorack, two miles from Beauly, may either be driven to all the way, or train may be taken to Beauly (Dingwall to Beauly, eight and a half miles). The drive is by Moy Bridge (mentioned in the drive to the Falls of the Orrin), the small village of Marybank (turning here to the left), the Established and Free Churches of Urray, the village of Tarradale, the Muir of Ord market-stand, and Beauly. From the road, after passing Marybank, fine views are obtained, on the left, of Brahan Castle and its surroundings (see last drive). On the plain of the Muir of Ord are two upright stone pillars commemorative of some feat of ancient warfare. The Falls lie west from Beauly, and are reached by way of Beauly Bridge, the road at the north end of the bridge leading westward along the north bank of the Beauly river, in the course of which

stream the Falls occur. They are situated immediately underneath the parish Church of Kilmorack, and are less remarkable for their height than their breadth and quantity of water, and for the beautiful accompaniments of lofty rocks, smooth green banks, and hanging woods which encircle them. The river, dashing from between two lofty precipices, where it is confined to an extremely narrow channel, suddenly expands into an open semicircular basin, through which it slowly glides, and is then precipitated over its lower edge in a series of small cataracts. Below the Falls, on the right bank of the stream, Beaufort Castle, the seat of Lord Lovat, is beheld to great advantage.* Fine views may be had from the clergyman's garden, and from a bridge across the river 200 or 300 yards below the Falls. Another group of waterfalls occurs about three miles up the river, at the top of a most romantic ride called "The Drhuim," which signifies a narrow pass. This is the most sweetly Highland and beautiful part of the course of the Beaully. On either hand the mountain acclivities are rather steep and rocky, and the valley between them is not a quarter of a mile broad; but woods of birch and fir encompass the whole scene, especially on the north side, and the edges of the river are fringed all along with rows of oak, weeping birches, and alders. In one part, half up the strath, near the cottage of Teanassie (the burn of which will reward its being explored), the waters plunge through a rocky passage encircling high pyramids of stone, standing up in the midst of the stream, gigantic witnesses of its ceaseless and consuming power. On the southern shore, on a high conical mound, rising above a perpendicular sheet of rock, is Dun Fion, a vitrified structure, laid open some years ago for the inspection of the curious by order of Lord Lovat. At

* A new Castle has just been built beside the old.

the further end of the Drhuim, the road begins to ascend towards the interior of the country, and here the river is seen pouring down on each side of a high rounded hill, covered with oak and birch, at the lower extremity of which it forms the second set of small but beautiful cataracts. This is the Island of Aigas (for the river parts into two, and encircles it), with a picturesque shooting-lodge, which was the summer retreat of the late Sir Robert Peel, during the last year of that great statesman's life. An open glen succeeds, with the house of Aigas (J. W. Gordon Oswald, Esq.) on the right; on the left, the elegant mansion of Eskadale (a shooting-lodge of Lord Lovat's); to the westward, the small hamlet of Wester Eskadale, behind which, though half-concealed by the birch trees, appear the white walls and pinnacles of a handsome Roman Catholic Chapel built by Lord Lovat, where may be seen the tombs of the Chevaliers d'Albany, the "Sobieski-Stuarts." Four miles on, is Erchless Castle, a stately old tower modernised, the seat of "The Chisholm." At Eskadale there is a ferry across the river, of which the pedestrian visitor to the Falls, and the Drhuim, might avail himself to vary the homeward route to Beauly—returning by a road which runs along the south side of the river through the parish of Kiltarlity. About a mile beyond Erchless are Struy Bridge and Inn. The drive from Beauly to Struy Bridge, up the one side of the stream and down the other, may be easily managed between an up train in the morning and a down train in the afternoon. More picturesque scenery than that along the course of the Beauly is rarely to be met with in the Highlands. The Kiltarlity road runs between the extensive and wooded grounds of Beaufort Castle (noticed above), and those of Belladrum (A. W. Merry, Esq.), one of the most elegant and costly mansions and demesnes in the Highlands. Time permitting, the

ruins of the ancient Cistercian Priory of Beauly, founded A.D. 1230, by John Bisset, of Lovat, might be inspected. On the course of the Glass (the continuation upwards of the Beauly), and between Fasnakyle Bridge (ten miles above Struy) and Loch Ben-neveian (five miles further on) is "The Chisholm's Pass," the scenery of which is somewhat similar to the celebrated birken bowers of Killiecrankie and the Trossachs, but on a much ampler and grander scale. In ascending the shelving opening (by the road on the north side of the stream), a prolonged vista, in one general mantle of foliage, rising high on either side forms a woodland picture of incomparable beauty, threaded by the rocky channel of the river. The road, on the south side of the stream, from Fasnakyle Bridge to Guisachan, the exceedingly picturesque Highland residence of Lord Tweedmouth, runs within a mile of the pass on the right.

THE BLACK ROCK.—A very extraordinary and interesting natural curiosity, and one well worthy of a visit, is what is called "The Black Rock," a frightful chasm, occurring in a thick level bed of conglomerate near Evantown on the Cromarty Firth. It is twelve miles from the Spa, and may either be driven to all the way, or train may be taken to Novar Station. If a carriage is taken, the drive along the margin of the Cromarty Firth will be much enjoyed. Between Dingwall and Evantown, the road and line of railway skirt in succession the estates of Tulloch (D. Davidson, Esq.), Mountgerald (Captain James Dixon Mackenzie), and Fowlis (Sir Charles Munro). A branch road, striking off northwards from the main road, just beyond Evantown, brings us in a mile, near to the chasm. It is then reached by crossing, from a little saw-mill on the roadside, the corner of a field on the left. Only eight feet wide, and in many

places arched over by intermingling branches of trees from the opposite sides, it is 200 feet in depth, and about two miles in length. At its bottom, the waters of the Aultgraat or *terrific burn* (crossed on leaving Evantown), visible only here and there from the bank above, rush and growl, and tumble, and rumble, boom, bellow, and thunder down deep in hideous subterranean gloom, fit haunt for gnome or goblin grim. A footpath along the wooded bank conducts, a mile and a quarter upwards, to a wooden bridge over the chasm, from which (if the beholder will venture) an open view of its profundity may be obtained. The Aultgraat issues from Loch Glass, about three miles above the chasm, and forms, after quitting the loch, a series of highly picturesque falls. Loch Glass lies at the base of Ben-Wyvis. The chasm is evidently the result of the action of the water on the rock, mostly, perhaps, at a time when the conglomerate was in a less compact state than now.*

ARDROSS CASTLE.—Ardross Castle, the princely residence of Sir Alexander Matheson, is eighteen miles from the Spa. It will well repay a visit, and the drive to it is a most enjoyable one. The Castle is five miles from Alness, the next village eastward, by road and railway, from Evantown just referred to. On quitting Evantown, we enter on the magnificent estate of Novar (R. C. M. Ferguson, Esq., of Raith and Novar). The fine mountain of Fyrish, beautifully wooded, and topped by a clump of perpendicular stones, arranged as an Indian temple, attracts special attention. A peep of Novar House down the approach is obtained from the road in passing. Two miles beyond Evantown, a road,

* Of course, such places as this and the Old Knockfarrel Fort have in "the North" their "legends." See Hugh Miller's "Scenes and Legends of the North of Scotland," pages 38 and 171; also, "Rambles of a Geologist," page 333. Miller's opinion was that the chasm was simply a fault in the conglomerate similar to those occurring so often in the coal-measures.

striking off from the main road, at the old toll-house, into the interior of the country, conducts to the demesnes of Ardross. If train be taken to Alness Station, another road will be found leading up from the village to the grounds. Respectable visitors are always made welcome to see the grounds, garden, and public rooms of the Castle.

CROMARTY.—At Invergordon, three miles beyond Alness, there is a ferry to the Cromarty side of the firth. This is a pleasant and convenient route for visiting the native place of Hugh Miller. A conveyance, running between the landing-point and Cromarty, in connection with trains passing Invergordon, leaves the ferry (at present) at 10 A.M. and 6 P.M. The distance to Cromarty from the ferry is eight miles. At Balblair Inn, on the opposite shore, carriages are let out on hire.

DUNROBIN CASTLE.—With railway extension now into Sutherlandshire, Dunrobin Castle, the magnificent residence of the Duke of Sutherland, near Golspie, is within easy access from Strathpeffer (from Dingwall to Golspie, some three hours). The scenery of the Sutherland part of the journey will be much enjoyed. Their Royal Highnesses the Prince and Princess of Wales are frequently the guests of the Duke and Duchess of Sutherland at Dunrobin. The Castle was founded by Robert, second Earl of Sutherland, A.D. 1097, and by recent additions has become "one of the most princely palaces in the kingdom, and undoubtedly one of the largest in Scotland." The private rooms are arranged into numerous suites of apartments, each appropriated to some member of the family, and named accordingly, as the Argyle, the Blantyre, and other apartments, and each is distinguished by its own peculiar style, coloured decorations, and paintings. The state-rooms specially prepared for Her Majesty, command the grand

sea-ward view, comprehending almost the entire circuit of the Moray Firth. They are, of course, furnished in the most sumptuous manner, as are also the other public and principal private rooms. Admission is liberally granted to the Castle and grounds. The late Mr. Barry's genius appears to great advantage in the style of the building, and the good taste of the late Sir Joseph Paxton is seen in the gardens.

The late Mr. Frank Buckland, in his "Log Book of a Fisherman and Zoologist," remarks, "a museum situated in the pleasure-grounds near the Castle, is admirably fitted up, and contains a most interesting collection. The antiquities, especially the Pictish relics, are well worthy of notice, but to the naturalist the collection of birds is of the highest interest. In the museum we find specimens of nearly all the native *avi-fauna* in Scotland."

The same interesting writer also observes, that the Duke of Sutherland is head of Clan Chattan, or the "Clan of the Cats," and mentions that His Grace was good enough to show him the silver brooch that he wears in his bonnet. It represents the head of a cat, and is mounted with two wild cat's teeth, one of which was found in an ancient Pictish tomb. At the first Cat Show held at the Crystal Palace in July, 1871, the Duke of Sutherland exhibited a splendid wild cat, caught by Captain Houstoun of Kintradwell. This wild Scotch cat won a prize of £1. 10s.

Mr. Buckland goes on to say, that, "there is perhaps no district in the Highlands where the breed of wild cats exists in greater purity or perfection than in Sutherlandshire . . . Tradition has it that once upon a time Sutherland was invaded by a hostile band, and that upon landing they were opposed by an advanced guard of furious wild cats, and so well did the latter defend the coast, that the enemy ske-

daddled without coming to the scratch ! . . . The breed of real wild cats is, I am sorry to say, in many districts extinct, and getting more scarce every year in this country. Civilization in general, and keeper's traps and terriers in particular, will ultimately finish the race. Nevertheless, a good remnant will be left for future lovers of natural history, as long as the fine old deer-forests are kept up. Let us hope that game-preservers and keepers may deal leniently with this fine animal, now becoming so scarce, and that Sutherlandshire in particular may never want some living representatives of the crest of its noble house."

The Duke of Sutherland (Sir George Granville William Sutherland Leveson Gower), Marquess of Stafford, Earl Gower, Viscount Trentham, Baron Gower, in the peerage of England ; Earl of Sutherland, and Baron of Strathnavar, in that of Scotland ; and a baronet ; Lord Lieutenant of Sutherlandshire ; born 19th December, 1828 ; succeeded his father as 3rd duke, 28th February, 1861 ; married 27th June, 1849, Anne, only child of the late John Hay-Mackenzie, of Newhall and Cromarty, created 21st October, 1861, Countess of Cromartie, Viscountess Tarbat of Tarbat, Baroness Macleod of Castle Leod, and Baroness Castlehaven in the peerage of the United Kingdom ; in her own right, with limitation to her second surviving son Francis. Issue :—

1. George Granville, Earl Gower, born 27th July, 1850, died 5th July 1858.

2. Cromarty, Marquess of Stafford, born 20th July, 1851.

3. Francis, Viscount Tarbat, born 3rd August, 1852, married 2nd August, 1876, Lilian Janet, third daughter of Godfrey William, fourth Baron Macdonald.

1. Florence, married 15th December, 1876, to Henry

Chaplin, Esq. of Blankney, Lincolnshire, M.P., for Mid-Lincolnshire, died 10th October, 1881.

2. Alexandra.

The title of Earl of Cromartie, forfeited in the person of George, third Earl, after the rebellion of 1745, has thus been restored to a descendant of the same family, by a new creation in favour of the present Duchess of Sutherland.

William, sixteenth Earl of Sutherland, was one of the loyal Highland chiefs at the time of the rebellion, and contributed much to its suppression.

At Golspie there is superior hotel accommodation. The Kildonan gold district is accessible by railway, the station being a little over an hour's ride from Golspie. Railway extension is now complete to Wick and Thurso. Some years ago, the Duke of Sutherland brought under cultivation moorland at Kildonan; by the side of Loch Shin, three miles from Lairg, he has, during recent years, also reclaimed several thousands of acres of moor, the improved land being thrown into holdings, varying in extent from 10 to 400 acres each, with suitable proportion of hill outrun. When the belts of plantation which are now springing up around these farms have sufficiently grown, their amenity will be much enhanced.

BATTLEFIELD OF CULLODEN. — A very interesting excursion might be made by railway to Culloden Moor, the scene of the last battle on British soil, where Prince Charles Stuart, after having penetrated into the heart of England, and imperilled the existence of the Hanoverian dynasty, was at last defeated by the Duke of Cumberland, and the hopes of the house of Stuart finally extinguished, April 16th, 1746. Culloden Station is three and a quarter miles from Inverness, and the battle-field about three from the station. A monumental tumulus or obelisk on the heath, abandoned after

being barely commenced, marks the spot where the contest was fiercest ; and the public road passes through the graves of the slain, which consist of two or three grass-covered mounds (see footnote, page 72), rising slightly above the adjoining heath, at the distance of about 200 or 300 yards from some corn land and a cluster of cottages, where the English artillery took up its position, a slight marshy hollow intervening between them and the Highland army. The ash-tree whence Prince Charles beheld the battle still stands, the best part of a mile to the west ; and the less perishable boulderstone, from which, it is said, the Duke of Cumberland issued his orders, is shown on the roadside, about a quarter of a mile east from the principal heap of graves. About 1200 men are said to have perished in the battle, the number of killed on both sides being about equal. "Never was rebellion more cruelly punished. Neither on the field, nor in the flight, was quarter given. Even when they had disbanded, and fled to the shelter of their mountain homes, the rebel clans were hounded out by the King's soldiers ; the whole country was wasted with fire and sword, and the women and children who escaped immediate death, were left to die by thousands, of cold and hunger on the barren heath. In the midst of this desolation, the Prince himself wandered a wretched outcast, and after many a hairbreadth escape, was taken on board a French privateer, and landed safely in Brittany. A price of £30,000 had been set on his head, but not a Highlander could be found mean enough to betray him."* The present proprietor of the estate of Culloden has recently placed at the head of each trench a memorial stone of grey granite, bearing, in deeply cut letters, the name of the clan whose representatives were, according to tradition, interred therein.

* See more fully "Charles Edward," in the "Imperial Dictionary of Universal Biography."

In Culloden House (D. Forbes, Esq.), passed on the way to the battle-field from the station, are some interesting relics of these times. The bed in which the Prince slept prior to the battle, and his walking-stick, are carefully preserved, and there are also several swords, pistols, battle-axes, &c., which have been picked up from time to time on the battle-field. The present Culloden House was built in 1780, on the site of the old castle. The battle is interestingly referred to by Miller in his "Scenes and Legends," page 323.

FORT-GEORGE.—Fort-George, at the entrance of the inner basin of the Moray Firth, and three and a half miles from the Fort-George Station, was erected soon after the suppression of the rebellion of 1745 for the purpose of keeping the Highlanders in subjection. The fortifications cover an area of about fifteen English acres, and there is accommodation, it is said, for about 3000 men. The Fort-George Station is ten miles from Inverness. An omnibus generally waits to convey passengers from the station to the Fort.

RAILWAY.—The grandly picturesque Dingwall and Skye railway has made pleasantly accessible, from Strathpeffer, the Highlands and the Islands of the West Coast. Some may imagine that railways interfere with sport, but, as the late Mr. Buckland remarked, "A great advance has been made in making the railway which runs due west from Dingwall, thus bringing Skye into communication with big towns. I do not think railways interfere much with red deer. . . . We have all of us seen sheep and cows staring quietly at the train as it passes at full speed through their enclosure, and why should not deer also get accustomed to the noise and rattle? I understand, however, that railway wire fencing will sometimes cut off deer from their own forests, but I have heard from Lord Lovat that the deer go along by the

wires until they find out the passage of the bridges, and then get over them. Railways, therefore, do not, as far as I hear, interfere with shooting; they open up properties, they encourage commerce, they bring capital and fresh blood into Scotland." In the journey from Dingwall to Golspie, we pass through, in succession, the countries of the Munros, Rosses, and Sutherlands. The country of the Mackenzies extends from Cromarty to the west coast of Ross-shire, and includes Lewis. The Beauly river runs through the countries of the Frasers and Chisholms. Culloden moor is in the country of the Mackintoshes.

A well-known writer says, "there is no county in Great Britain or Ireland that offers so many enjoyable excursions whether far or near, as Ross-shire."

GEOLOGY.

A calcareo-bituminous rock—Fish-bed Schist of the Old Red Sandstone system—emitting when broken a peculiar fetid odour, the result, of the decay of animal matter still going on—occurs everywhere in the neighbourhood of the Wells; it is highly absorptive of water, which partly explains the rapid drying of the soil after rain. It presents generally a laminated, but sometimes also a mixed compact appearance, (*breccia*), the latter evidently being the result of the laminæ of the former having been broken up by some violent movement prior to final consolidation; in some places it is exceedingly hard and heavy, taking on a jet-like polish. From this rock, the sulphur waters of the place derive their ingredients and properties (see page 19). Kinettas Hill, behind the Spa, and the rising ground between the Pavilion and the Cat's Back Hill (see page 73), appear

to be entirely composed of it. Says Hugh Miller, in his "Old Red Sandstone," "Is it not a curious reflection that the commercial greatness of Britain in the present day should be closely connected with the towering and thickly-spread forests of arboraceous ferns and gigantic reeds—vegetables of strange form and uncouth names—which flourished and decayed on its surface, age after age, during the vastly extended term of the carboniferous period, ere the mountains were yet upheaved—and when there was as yet no man to till the ground? Is it not a reflection equally curious, that the invalids of the present summer should be drinking health, amid the recesses of Strathpeffer, from the still more ancient mineral and animal débris of the lower ocean of the Old Red Sandstone, strangely elaborated for vast but unreckoned periods in the bowels of the earth? The fact may remind us of one of the specifics of a now obsolete school of medicine which flourished in this country about two centuries ago, and which included in its *materia medica* portions of the human frame. Among these was the flesh of Egyptian mummies, impregnated with the embalming drugs—the dried muscles and sinews of human creatures, who had walked in the streets of Thebes or Luxor three thousand years ago."

The rocks in the immediate vicinity of the Spa belong generally to the Old Red Sandstone, a formation thrown down from deep salt seas abounding in fish rather than in vegetable matter. The animal organisms of the Strathpeffer fish-bed schist appear to have been of an entirely destructible nature, no fossilized remains, so far as I understand, having been discovered in it. A seam of soft friable bitumen, capable of yielding a high per cent. of oil, occurs in the hill above Castle Leod, presenting an appearance as if spurted up through rock resembling mountain limestone,

but of the fish-bed schist character, not however, according to recent investigations, in sufficient quantity to pay the working of it. A finer variety of this mineral, (albertite,) occurring in hard jetty-looking pieces, and highly inflammable, has been dug up near the river Skiach, at the foot of Ben-Wyvis. The ridge of hill extending from Knockfarrel to the Brahan Rocks, is entirely or mainly conglomerate—the great base of the Old Red System. Conglomerate also abounds in the Fairburn direction, and constitutes the majestic east front of the fine hill of Tor-Achilty. It exists also in vast proportions along the northern margin of the Cromarty Firth. Primary gneiss is the prevailing rock of the hills to the north and west of the Spa. The bottom of the valley of Strathpeffer is of an alluvial character, which would partly account for its great fertility. Other inland recesses in its neighbourhood are of the same description. Raised terraces (ancient beaches), sometimes double, of water-rolled pebbles may be seen along the plain of the Blackwater, notably at the base of the hill of Tor-Achilty. Similar terraces are seen from the road west of Achnasheen Inn. Query, may gigantic Wyvis be settling down a little, causing a bulging upwards of part of the world around him? Glacial scorings are very pronounced on many of the rocks in the district, and many boulders, among the gneissose hills, proclaim by their extraneous structure, that they have been wanderers once, borne away by nature's agencies from their parent rocks, and left where they now rest. Glacier drifts abound, and are very marked in the drive between Loch Achilty and the Conon Falls, and between Strathpeffer Station and Garve. Fine specimens of garnet and mica are met with in the district, especially in the railway cutting between Strathpeffer and Garve. At the Raven's Rock, tourmaline may be picked up. Epidote, so rare, occurs

near Loch Garve on the west side of the turnpike road ; and zoocite in the railway cutting there.

ANTIQUITIES.—Among these, cupped stones (connected with some ancient superstition), and the old stone hand-mills (querns) used for grinding corn, which Cæsar when he invaded Gaul found in general use, and which were used by the Egyptians 4000 years ago,* are here and there to be seen. The most interesting specimen, in the district, of a cupped stone, is to be seen close to the last house on the road usually taken in the ascent of Ben Wyvis ; it exhibits about 100 markings. Tumuli, the sites of ancient burial places, may be seen on the “ heights ” on the boundary between the Cromarty and Tulloch estates ; also on a rising ground, south-west of the Cat’s Back Hill, and in the *Beallock-Mohr* or Big Pass of Ben Wyvis. Whorls, slinging balls, flint flakes and scrapers, arrow-heads, spear-heads, stone hammers, barley stones, and celts or stone axes (made from iron-stone or flint), and other objects of the stone age, have been found in quantity. The whole field around the Spa is as free, as it is inviting, to the scientific enthusiast, who desires to search in it.

BOTANY.

The less common botanical specimens met with in the district are, the *Pinguicula lusitanica* and *Melampyrum sylvaticum*, near Castle Leod ; the *Pyrola uniflora*, *Corallorhiza innata*, *Malaxis paludosa*, and *Lycopodium inundatum*, in the neighbourhood of the View Rock ; the *Linnæa borealis*, in the Brahan Woods ; the *Thalictrum alpinum*, and *Circæa alpina*, on Scur-Marxy ; the *Arbutus alpina*, *Saxifraga oppositifolia*, *Betula nana*, *Azalea procumbens*, *Alopecurus alpinus*,

* Exodus XI and 5.

Arctostaphylos uva ursi and *alpina*, *Rubus chamæmorus*, *Polypodium phegopteris*, *Salix myrsinites*, *Lycopodium alpinum*, *Epilobium alpinum*, and *Saxifraga stellaris* around and upon the Wyves; the *Epilobium angustifolium*, *Lycopodium selaginoides*, and *Saxifraga aizoides* in the neighbourhood of the Falls of Rogie. The district is a good one for the collecting of ferns. Mosses also of every shade and colour are to be met with. Many trees of the neighbourhood are remarkably fine, indicating a climate highly favourable to vegetation.

PLACES OF WORSHIP.

The Established Church of Fodderty (Rev. J. Menzies), is a mile eastward from the Spa, the Free Church (Rev. W. S. Macdougall) over a mile westward, the Established Church of Contin (Rev. J. Tolmie), about three miles westward. The services are in Gaelic in the morning, and in English in the afternoon. The Episcopalian Church (Rev. W. J. Bussell), services—Morning Prayer and Holy Communion every Sunday at 11.30 A.M., at St. James's, Dingwall; Evening Prayer with Sermon every Sunday afternoon at 3.30, in the Pavillion, Strathpeffer, in summer, for the convenience of members of the Church of England staying at the Spa. During the season there are Presbyterian services in English every Sunday, morning and evening, in the Pavilion, in connection with the Established Church of Scotland, and in the Meeting-house, in connection with the Free Church. There are also, daily religious services in the Meeting-house at 11 A.M., conducted generally by clergymen attending the Wells. The Meeting-house is the gift mainly of H. M. Matheson, Esq., of London, who has placed in it a small library, chiefly of religious books, to which there is easy access.

CONCLUSION.

The reader will not have failed to perceive the many and splendid natural advantages of Strathpeffer, and the possibilities in store for it. Till within the last sixteen years, nature had done everything for the place, man but little. It is now being developed, and must in the future advance. Peat or mud baths, the virtues of which are freely admitted, and which are to be had at many German Spas, might easily be introduced ; also sand baths ; perhaps by-and-by milk and whey "cures." The chalybeate water, now effervescent, might be easily and effectively bottled for extensive use as an iron tonic drink.

In the early part of the present century, Dr. Morrison, of Elsick, having had his own health re-established at the Spa, strongly advocated to his friends the claims of the waters. His portrait is now in the Pump-Room.

As has been shown in the foregoing pages, the sulphur springs are far the strongest of their class in this country, indeed among the first in Europe, while peculiarly applicable, both as external and internal remedies ; the climate is bracing without being cold ; the situation is sheltered and picturesque, combining cultivated country with truly Highland scenery. In short, Strathpeffer, being now easily accessible, and yearly becoming, through the merits of its Springs, more and more widely renowned, will, with its remarkably salubrious climate, ultimately be a Queen among British Spas, and rank high in the list of the Health-resorts of Europe.

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EXTRACTS FROM REVIEWS

OF THE

SECOND EDITION OF THIS WORK.

".....A sensibly-written *brochure* setting forth in a favourable light the virtues of this Spa, which evidently deserves to take a high rank amongst sulphurous waters, whether British or Continental."—*"Bibliotheca Therapeutica" of New Sydenham Society.*

".....Strathpeffer is now a strong claimant for public favour, and apparently deserves it. It boasts the advantages of pure air and lovely scenery; and even the twenty hours' distance from London may be regarded as an advantage by dyspeptic invalids. The climate is represented as one of the purest and most salubrious in Great Britain..... The inhabitants, it is said, rarely suffer from consumption. Rheumatism, indigestion, liver and skin diseases, are those on which the sulphur water acts most beneficially. Dr. Manson's little guide to the Strathpeffer Spa, is concise and satisfactory. It gives all needful information, and it is entirely free from the grandiloquence and the puffing which form conspicuous features of so many local hand-books."—*Pall Mall Gazette.*

"The sulphurous waters of Strathpeffer, near Dingwall, Ross-shire, are among the most celebrated and beneficial of the Scottish mineral waters. The vale of Strathpeffer itself is one of the most picturesque in a picturesque country. Almost under the shadow of the Mountain of Storms and the mighty dome of Ben-Wyvis was the old battle-ground of the Mackenzies, now against the Macdonalds, now against the Munroes. Victory generally sat on the bonnets of the former. To speak in local phrase, the 'Caberfae' carried the day. To this district Dr. Manson has written a valuable, concise guide—one not only for invalids, but for healthy tourists; for idlers, loungers, men of science, excursionists who have done the Engadine, and should now be thankful for the opportunity Dr. Manson gives them to explore this Scottish home of beauty with his book in hand. It is a sensible book, put together by a competent man of science, who having something to say, knows how to say it, and how to leave off when he has said enough."—*Notes and Queries.*

".....Of the Strathpeffer springs, several are sulphurous, one very strongly so, containing nearly nine grains of sulphur per gallon, partly in the free state, and partly as sulphides of hydrogen, potassium, and sodium. There is also a chalybeate spring, said to contain about two and a half grains of ferrous carbonate per gallon....."—*The Lancet.*

".....We welcome Dr. Manson's sensible guide to Strathpeffer, both to its waters and to the surrounding scenery. It will be very useful to visitors of that romantic spot..... The accommodation in lodgings and hotels has greatly improved of late years at Strathpeffer

REVIEWS.

.....Dr. Manson is quite right in calling attention to the fact that, according to published analyses, the strong new well is undoubtedly a very powerful sulphur spring....."—*British Medical Journal*.

"Dr. Manson has published a second edition, of his little book on the sulphur waters of Strathpeffer, which have attained some fame among those who have faith in the curative powers of mineral springs....."—*The Daily News*.

"Invalids who believe in the efficacy of foreign waters only, will do well to consider the virtues of the Strathpeffer Spa, as set forth by Dr. Manson....."—*The Graphic*.

"The valetudinarian class of travellers and excursionists from town, before they resolve to start for Germany or Switzerland, should once more be reminded that North Britain has its medicinal waters, as well as its refreshing airs and interesting scenery, which may do them as much good as those of the Taunis, the Black Forest, the Alps, or the Pyrenees. To Strathpeffer, in Ross-shire, twenty-five miles beyond Inverness, we would direct the attention of those who are recommended to try a fine sulphurous cold draught, for the benefit of the stomach and liver and other digestive organs, and of the skin, and the nervous system.—*The Illustrated London News*.

"The Strathpeffer Spa has a well-merited reputation even so far south as London, and to anyone who knows it not, and who desires to try sulphur waters, we can, relying on trustworthy medical information, confidently suggest a visit to Strathpeffer. The place is easy of access, and picturesquely situated, and the visitor, whether he be an invalid or merely a seeker after new scenes, will find abundant information regarding it in this new edition of Dr. Manson's valuable little book....."—*Vanity Fair*.

"Strathpeffer is a Spa of old repute. Its waters are rich in sulphuretted hydrogen and sulphur, resembling those of Harrogate, Moffat, and Aix-la-Chapelle, but containing more sulphuretted hydrogen than any in Britain. In this little book Dr. Manson tells us all we want to know about these waters, and the ailments likely to derive benefit from their use..... Those seeking relief from such, will do worse than visit the glorious scenery of the Highlands, amidst which this Spa is situated."—*The Medical Mirror*.

"This little work will be found a useful guide to persons intending to try the Strathpeffer waters..... The author states concisely what he believes to be the rationale of the curative process..... A very useful portion of the book is that which contains the analysis of the Spa waters....."—*The Examiner*.

"This Highland Spa, which has become more accessible than it was some time ago, is highly recommended by the author, as a health-resort for those suffering from rheumatic affections and cutaneous diseases..... An account of the walks and drives, geology, botany, etc., render this little work a popular guide for visitors generally, as well as a hand-book for invalids."—*The Literary World*.

REVIEWS.

"Dr. Manson has issued a second edition, brought up to datefor the waters of which he claims greater curative efficacy than belong to those of any other watering-place in Great Britain."—*Scotsman*.

"Attention is called in this little publication to the Strathpeffer waters and their value as a restorative agent. It appears that these sulphur springs are the first of their class in Great Britain, and in these days of commercial depression, physicians and the health-seeking portion of the community, would do well to consider the advantages of Strathpeffer as a summer retreat. Dr. Manson gives copies of reports on examinations of the waters made at different times by Drs. Murray Thomson and Stevenson Macadam. The concluding portion of Dr. Manson's *brochure* contains descriptions of the various places of interest and resort in the neighbourhood of the wells."—*The Edinburgh Courier*.

".....We are glad to notice the issue of a second edition, the want of which was much felt. Dr. Manson, who was for several years resident physician at Strathpeffer, thinks it is a mistake to suppose that the good to be derived from the Spa is confined to the summer months..... The medicinal power of the waters is remarkable among the sulphurous waters of Europe. Dr. Manson assigns to them as a speciality, that their tendency is to be absorbed by the stomach and intestines, and received through the liver into the general system....."—*The Inverness Courier*.

"We have here a very comprehensible and satisfactory handbook of the famous Strathpeffer Spa..... That Strathpeffer is destined to a still wider popularity there would seem every reason to believe In view of facts fully stated, the suggestion that, before rushing away to foreign Spas, seekers after health and pleasure should look to the claims of Strathpeffer, seems to be eminently reasonable."—*Aberdeen Daily Free Press*.

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".....Strathpeffer is now a strong claimant for popular favour, which it undoubtedly deserves..... The climate is represented as one of the purest in Great Britain. Dr. Manson's guide is concise, and gives all needful information....."—*Cook's Excursionist*.

"It is difficult to see what Dr. Manson has omitted which is likely to be of value to the visitor, whether invalid or tourist. We feel sure that the book will be of interest to all who take it up, whilst Dr. Manson has undoubtedly done great service to many sufferers in making better known a Spa possessing such extraordinary natural advantages."—*Derbyshire Times*.

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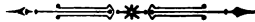
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